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Frailty prevalence and associated factors in hemodialysis patients☆

Prevalencia de fragilidad y factores asociados en pacientes en programa de hemodiálisis

Dear Editor,

Frailty has been defined as a syndrome or state of deterioration and increased vulnerability to situations of stress which occurs with ageing. It is characterised by weakness and diminishing of functional biological reserves, which leads to an increased risk of further deterioration towards disability, hospitalisation and death.[1,2] Frailty is not the same as disability and comorbidity; although the three concepts are closely related and affect each other, they do not always coexist.[3]

Although frailty has been defined as generally associated with advanced age and ageing, there are conditions and diseases that cause changes similar to ageing which can lead to a state of frailty at younger ages, and one of these situations is chronic kidney disease.[4–6] The prevalence of frailty in patients on haemodialysis has been estimated by different studies at 26–73%.[7,8] The huge variability can be explained by differences in the populations studied and the different tools used to assess frailty.[9,10] In Spain, no studies have been published to date on the prevalence of frailty in patients on haemodialysis.

Our aim was to estimate the prevalence of frailty in patients on haemodialysis in the southern health area of Gran Canaria and to study some of the associated demographic, clinical and analytical factors. We designed a cross-sectional study of 277 patients on haemodialysis, estimating frailty using the Fried Frailty Phenotype Index (FFPI) and the Edmonton Frail Scale (EFS). The FFPI is a standardised five-item scale that measures weakness, slow gait speed, exhaustion, low physical activity and weight loss. The EFS contains 11 items that also measure other spheres of frailty, such as cognitive, psychological and social factors. We collected demographic and clinical data, the Charlson comorbidity index and analytical parameters. Patients were then followed up for a year to assess mortality rates according to frailty.

The prevalence of frail patients with the FFPI was 41.2% and, with the EFS, 29.6%. Fig. 1 shows graphs of the prevalences found with both tests. We found a lack of consistency between the scales; of patients frail with EFS, 83% were frail with FFPI and 17% pre-frail, and of patients frail with FFPI, 60% were frail with EFS and 40% vulnerable or non-frail. The EFS classified a larger number of patients as non-frail, while the FFPI classified a larger number as pre-frail. It is difficult in a cross-sectional study to determine the reason and the prognostic implications of this lack of consistency, but it could be a result of the different spheres of frailty measured by each of the tests.

Table 1 shows the main demographic, clinical and analytical characteristics according to the results of the two tests. We can see that there is an association between frailty and other clinical data suggesting poor prognosis, such as advanced age, diabetes mellitus, a higher Charlson comorbidity index and being female. Among the analytical parameters, a slight but statistically significant decrease in haemoglobin, albumin and uric acid was found in the pre-frail and frail groups with respect to the non-frail. We found no differences between groups in the parameters of bone-mineral metabolism or lipid profile. There was a significant decrease in CPK with frailty, which may reflect a decrease in muscle mass due to

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Table 1 – Demographic, clinical and analytical characteristics.

	Fried Frailty Phenotype Index				Edmonton Frail Scale			
	Not frail	Pre-frail	Frail	*p*	Not frail	Vulnerable	Frail	*p*
Age	52	62	71	<0.001	62	65	71	<0.001
Percentage of males	77.5	70.7	55.3	<0.01	71.8	67.9	52.4	<0.05
Percentage with diabetes	37.5	51.2	71.1	<0.001	43	32.3	79.3	<0.001
Charlson Index	4.7	5.9	7.9	<0.001	5.6	6.7	8	<0.001
Months RRT	30.6	28.3	49.1	<0.05	29	33	50	n.s.
BMI	26.5	27	27	n.s.	27	27	26	n.s.
Haemoglobin	11.8	11.3	11.4	<0.05	11.7	11.3	11.1	<0.01
Albumin	3.7	3.6	3.5	<0.001	3.7	3.5	3.5	<0.01
Uric acid	6.6	6.4	5.7	<0.001	6.4	6.5	5.6	<0.001
Calcium	8.7	8.8	8.9	n.s.	8.8	8.9	8.8	n.s.
Phosphorus	4.7	4.3	4.2	n.s.	4.4	4.5	4	<0.05
iPTH	262	275	249	n.s.	277	225	272	n.s.
CPK	104	82	56	<0.001	91	67	50	<0.001
Total cholesterol	132	145	140	n.s.	147	140	135	n.s.
Triglycerides	130	139	112	n.s.	130	126	113	n.s.
Potassium	5.4	5.3	5.3	n.s.	5.3	5.5	5.3	n.s.
C-reactive protein	0.32	0.42	0.6	<0.05	0.41	0.61	0.48	n.s.
NT-proBNP	2637	3230	6944	<0.001	3122	6523	7599	<0.001
RDW	14.6	15.4	16	<0.001	15.1	15.6	16.3	<0.005

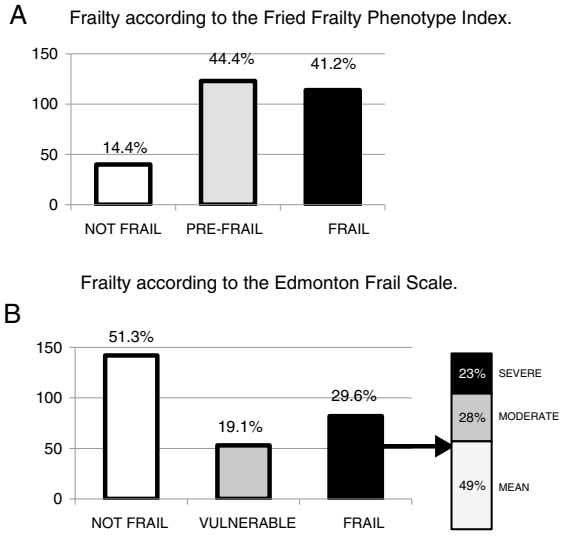

Fig. 1 – Prevalence of frailty according to the Fried Frailty Phenotype Index (A) and the Edmonton Frail Scale (B).

frailty-associated sarcopenia. We also found an increase in certain analytical parameters described as markers of poor prognosis for their relationship with inflammation or overhydration, such as C-reactive protein, NT-proBNP and red cell distribution width.

At one-year follow-up, the mortality rate was 21.1% in frail patients versus 11% in pre-frail and non-frail patients with the FFPI ($p < 0.05$). With the EFS, the mortality rate was 26.8% in frail patients compared to 10.3% in vulnerable and non-frail patients ($p < 0.001$).

In conclusion, we found a high prevalence of frailty in patients on haemodialysis. Frailty is associated with poor short-term outcomes. However, we found a lack of consistency between the tests used to measure frailty, and further studies are therefore necessary to validate the frailty tests in patients on haemodialysis, determine their prognostic value and establish the impact of possible therapeutic measures to reverse frailty in this group of patients.

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Litiasis due to 2,8-dihydroxyadenine, usefulness of the genetic study☆

Litiasis por 2,8-dihidroxiadenina, utilidad del estudio genético

Dear Editor,

Renal lithiasis affects 6–15% of the western population,[1] and the causes are usually being well identified. However, in some cases the diagnosis is more complex and the rapidity of the diagnosis has important consequences in the prognosis. We present one example of this here.

The patient was a 27-year-old male who was referred to our clinic from the primary care physician with haematuria. His previous medical history included allergy to aspirin, appendectomy and he was an active smoker. At the age of 13, he had macroscopic haematuria (seen in another hospital), and was diagnosed with haematuria secondary to exercise. At 23, he had a lower urinary tract infection, which was treated conventionally. At 24, he suffered a first episode of expulsive renal stone, with another episode six months later. No investigation of lithiasis was carried out. Regarding family history his maternal grandmother suffered recurrent renal stones. From that point, the episodes became far more frequent, occasionally accompanied by low urinary tract infections of multisensitive-*E. coli*. At the time of the assessment, he was not on any medical treatment. The patient had an athletic phenotype, normotensive, who has a work with moderate physical after which he occasionally has haematuria with voiding symptoms. He denied skin abnormalities or abdominal or joint pain. He did not have repeated infections. Renal ultrasound detected two stones measuring 11 and 15 mm in the left kidney and another two of 6 and 8 mm in the right kidney, which were not causing hydronephrosis; they were radiolucent on the plain abdominal X-ray. Laboratory tests showed normal glomerular filtration rate with moderate haematuria and proteinuria of 0.06 g/day. The lithiasis study showed no significant abnormalities (serum levels of PTH, uric acid, calcium, phosphate, agnesium, calciuria, phosphaturia, uricosuria, magnesiuria, citrate and oxalic acid in urine were normal; urine pH: 5.5). It was estimated a protein intake of 90 g/day and 12 g/day of salt. The immunology study was normal, including IgA. Examination of renal stones revealed an irregular appearance, soft consistency and brown colour, with a composition of 2,8-dihydroxyadenine. He was started on treatment with oral allopurinol and genetic study confirmed the presence in homozygosis of a change of G for T in nucleotide 359, exon 4, which causes a change of glycine for valine in amino acid 120; NM 000485.2 (of the APRT gene): c.359G>T (p.Gly120Val), defined by the Mutation Taster system as of uncertain significance and by Polymorphism Phenotyping v2 and Sorting Intolerant from Tolerant as probably pathological. Not long after starting treatment, the patient suffered further episodes of expulsive renal stones that had to be treated by urethral endocatheterisation. At the time of writing this letter we have no new analyses available to corroborate the efficacy of the proposed treatment.

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