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ORIGINAL ARTICLE

Experience with the potassium binder patiromer in hyperkalaemia management in heart failure patients in real life

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Abstract

Aims Hyperkalaemia (HK) is common in heart failure (HF) patients, related to renal dysfunction and medical treatment. It limits medical therapy optimization, which impacts prognosis. New potassium (K) binders help control HK, allowing better medical management of HF.

Methods and results A retrospective multicentre register included all outpatients with HF and HK ($K \geq 5.1$ mEq/L) treated with patiromer according to current recommendations. We evaluated analytic and clinical parameters before starting the treatment and at 7, 30 and 90 days, as well as adverse events related to patiromer and treatment optimization. We included 74 patients (71.6% male) with a mean age of 70.8 years (SD 9.2). Sixty-seven patients (90.5%) presented HK in the previous year. Forty patients (54.1%) underwent down-titration of a renin–angiotensin–aldosterone inhibitor (RAASi) or a mineralocorticoid receptor antagonist (MRA), and 27 (36.5%) stopped any of them due to HK. Initial K was 5.5 mEq/L (SD 0.6), with a significantly reduction at 7 days (4.9 mEq/L (SD 0.8); $P < 0.001$), maintained at 90 days (4.9 mEq/L (SD 0.8); $P < 0.001$). There were no other electrolyte disturbances, with a slight improvement in renal function [glomerular filtration rate 39.6 mL/min (SD 20.4) to 42.7 mL/min (SD 23.2); $P = 0.005$]. Adverse events were reported in 33.9% of patients, the most common being hypomagnesaemia (16.3%), gastrointestinal disturbances (14.9%) and HK (2.8%). Withdrawal of patiromer was uncommon (12.2%) due to gastrointestinal disturbances in 66.7% of cases.

Nine patients (12.2%) started on a RAASi, and 15 patients (20.3%) on an MRA during the follow-up. Forty-five patients (60.8%) increased the dose of RAASi or MRA, increasing to target doses in 5.4 and 10.8% of patients, respectively. At 90 days, NTproBNP values were reduced from 2509.5 pg/mL [IQR 1311–4,249] to 1396.0 pg/mL [IQR 804–4263]; $P = 0.003$, but the reduction was only observed in those who optimized HF medical treatment [NTproBNP from 1950.5 pg/mL (IQR 1208–3403) to 1349.0 pg/mL (IQR 804–2609); $P < 0.01$]. NYHA functional class only improved in 7.5% of patients, corresponding with those who optimized HF medical treatment. Compared with the previous 3 months before patiromer treatment, the rate of hospitalization was reduced from 28.4 to 10.9% ($P < 0.01$), and the emergency room visits from 18.9 to 5.4% ($P < 0.01$).

Conclusions In a real-life cohort of patients with HF, patiromer reduced and maintained K levels during 3 months of follow-up. The most common adverse events were hypomagnesaemia and gastrointestinal disturbances. Patiromer helps optimize medical treatment, increasing the percentage of patients treated with RAASi and MRA at target doses. At the end of follow-up, natriuretic peptides values and hospital visits were reduced, suggesting the benefit of optimizing HF medical treatment.

Keywords Hyperkalaemia; Potassium binders; Patiromer; Heart failure

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Introduction

Heart failure (HF) clinical practice guidelines recommend treating HF patients with a renin–angiotensin–aldosterone system inhibitor (RAASi), a beta-blocker, a mineralocorticoid receptor antagonist (MRA) and a sodium-glucose cotransporter type 2 inhibitor (SGLT2i) at the maximum tolerated doses to reduce mortality and HF hospitalization.[1,2] However, real-life registers demonstrated that only 30% of patients achieved the target doses (TD) of these drugs.[3] One of the most common causes of reducing or stopping some of these drugs, especially RAASi and MRA, is hyperkalaemia (HK), sometimes associated with chronic kidney disease (CKD). HK is responsible for 8.5% of patients not taking a RAASi and up to 35% in the case of MRA.[3,4] The underuse and withdrawal of these drugs are related to poor prognosis.[3–7]

The incidence of HK in patients with HF is estimated to be around 4–8%, depending on the chronic or acute onset, and has been associated with an increase in mortality.[8–10] Its appearance is associated with age, comorbidities (CKD, hypertension, diabetes and cancer) and, importantly, RAASi and MRA treatment.[4,9] Clinical guidelines recommend using new K-binders [patiromer and sodium zirconium cyclosilicate (SZC)] to manage HK in HF patients to maintain and optimize HF treatment.[2,11–13]

Patiromer is an oral K-binder that exchanges K with calcium (Ca) in the distal colon, increasing its excretion through the digestive tract.[14] Several trials have demonstrated the efficacy of patiromer to control HK in the long-term follow-up, allowing the maintenance and optimization of RAASi and MRA.[15–19] Also, the studies demonstrated its safety, with a low incidence of HK or severe gastrointestinal effects, as occurs with ion-exchange resins.[16,17]

This study aims to evaluate the safety and efficacy of patiromer in patients with chronic HF and HK in real-life conditions, considering K management, medical treatment optimization and clinical events in a short-term follow-up.

Methods

A retrospective multicentre register included all outpatients with chronic HF and HK that started patiromer from September 2019 (when patiromer was marketed in Spain, with the indication for treating HK in adults) to June 2021, according to clinical practice and guidelines recommendations.[11–13] HK has been defined as K $\geq$ 5.1 mEq/L in the moment of patiromer beginning or the presence of at least one episode of HK during the last year. The patients were recruited in seven Spanish multidisciplinary HF units. The ethics committee of Hospital Universitario Severo Ochoa approved the study, and all patients consented to participate in the registry. The study complies with the Declaration of Helsinki.

The follow-up and HF drug optimization were made according to physician clinical practice in each hospital. We have included all HF patients regardless of left ventricular ejection fraction (LVEF) if RAASi or MRA treatment was indicated due to LVEF dysfunction or concomitant comorbidities, especially arterial hypertension and coronary artery disease.[2] Patient data were collected before starting patiromer, at 7, 30 and 90 days. Different variables were analysed: (i) medical history, vital signs, New York Heart Association (NYHA) functional class; (ii) LVEF and right ventricular function with tricuspid annulus plane systolic excursion (TAPSE)[20]; (iii) previous treatments as well as presence and function of cardiac devices at the time of inclusion; (iv) blood test parameters; (v) HK episodes in the previous 12 months and HF drug modification due to HK; (vi) aspects related to patiromer: starting dose, drug dose modifications or discontinuation during the titration and reported adverse effects (gastrointestinal effects, hypomagnesaemia, HK, hypercalcaemia, others); (vii) aspects related to medical treatment of HF: starting RAASi or MRA, dose modifications, discontinuation during the follow-up and maximum tolerated dose (target dose); (viii) occurrence of clinical events: death, emergency room visits or hospital admission [cardiovascular (CV) causes, non-CV causes and HK].

The study considered angiotensin-converting enzyme inhibitor (ACEi), angiotensin type II blockers (ARBs) or sacubitril/valsartan (SV) as RAASi and MRA separately. TD of drugs are the ones considered in HF guidelines.[1,2] CKD was defined as a mean estimated glomerular filtration rate (eGFR) $<$ 60 mL/min.

Statistical analysis

Quantitative variables are shown as mean and standard deviation (or median and interquartile range if they do not follow a Gaussian distribution). Adjustment to normality was assessed with the Kolmogorov–Smirnov test. Categorical variables are shown as frequencies and percentages. Continuous quantitative variables were compared using Student's *t*-test

or the sum of Wilcoxon ranges in non-parametric data and categorical variables with the chi-square and Fischer's exact test. An ANOVA with paired measures was performed to compare analytical parameters during the follow-up. We analysed NTproBNP reduction, NYHA improvement and clinical outcomes in the whole population and according to medical treatment optimization (starting or increasing the dose of RAASi or MRA during the follow-up). The analysis was performed with SPSS 21.0 and STATA 17.0.

Results

Seventy-four patients were included, with a mean age of 70.8 years (SD 9.2). Patients were more frequently male with a high prevalence of CV risk factors, ischaemic disease, CKD, reduced LVEF and NYHA II functional class (*Table 1*). Patients were well treated (*Table 2*), with a high percentage receiving RAASi (81.1%) and beta-blockers (96.0%). Less patients received therapy with diuretics (64.9% loop diuretics and 12.2% thiazides), MRA (48.6%) and SGLT2i (18.9%). The percentage of patients with non-reduced LVEF was low (18.9%), and all of them had arterial hypertension or coronary artery disease (47.3% ischaemic disease and 68.9% arterial hypertension).

Sixty-seven patients (90.5%) had presented a history of documented HK in the previous 12 months. The mean of HK episodes was 2.0 (SD 1.9), with a median of one episode for each patient [IQR 1.0–2.0]. Forty patients (54.1%) underwent down-titration of RAASi or MRA due to the HK episodes, and 27 (36.5%) had discontinued some of these drugs. Fifteen patients (20.3%) had received resins previous to patiromer treatment.

At the beginning of patiromer treatment, mean K levels were 5.5 mEq/L (SD 0.6) (*Table 3*). All patients started patiromer with a dose of 8.4 mg once a day (o.d). Most patients received patiromer at lunchtime (35.1%) or mid-morning (28.4%). At 7 days, K was significantly reduced to a mean of 0.6 mEq/L (P = 0.001) (*Table 3*). The reduction in K levels was maintained during the follow-up (*Figure 1*), with 25.7% of patients needing to increase the patiromer dose to 16.8 mg o.d. There was a trend in magnesium (Mg) reduction, but the analysis was limited due to only eight patients with all the determinations available. Renal function was stabilized, with a statistical trend to improve eGFR during the follow-up (39.6–42.7 mL/min; P = 0.005). NTproBNP values were significantly reduced at 90 days from a median of 2509.5 pg/mL [IQR 1311–4249] to 1396.0 pg/mL [IQR 804–4263], P = 0.003 (*Table 3* and *Figure 2*). The reduction was only observed in those who optimized medical treatment [1950.5 (IQR 1208–3403) vs. 1349.0 (IQR 804–2609); $P < 0.01$].

Table 1 Basal characteristics of patients treated with patiromer

Parameter	Patients (n = 74)
Sex (female), *n* (%)	21 (28.4)
Age (years)	70.8 (9.2)
Hypertension, *n* (%)	51(68.9)
SBP (mmHg)	119.2 (18.8)
DBP (mmHg)	69.7 (10.8)
Diabetes, *n* (%)	39 (52.7)
Dyslipidaemia, *n* (%)	44 (59.5)
CKD, *n* (%)	51(68.9)
BMI (kg/m^2)	27.2 (4.6)
Sinus rhythm, *n* (%)	44 (59.5)
HR (b.p.m.)	69.5 (10.5)
HF aetiology, *n* (%)	
Ischaemic	35 (47.3)
Dilated/familiar	18 (24.3)
Valvular	7 (9.5)
Other	14 (18.9)
LVEF (%)	36.7 (12.4)
TAPSE (mm)	18.8 (4.1)
Median NTproBNP (pg/mL)	2509.5 (1,311–4,249)
Type of HF, n (%)	
Reduced LVEF	50 (67.6)
Mild-reduced LVEF	10 (13.5)
Preserved LVEF	14 (18.9)
Functional class, *n* (%)	
NYHA I	4 (5.4)
NYHA II	46 (62.2)
NYHA III	20 (27.0)
Devices (ICD/CRT), *n* (%)	29 (39.2)
Previous hospital admission[a], *n* (%)	21 (28.4)
CV causes	19 (25.7)
Non-CV causes	1 (1.4)
Hyperkalaemia	1 (1.4)
Previous emergency room visit[a], *n* (%)	14 (18.9)
CV causes	9 (12.2)
Non-CV causes	3 (4.1)
Hyperkalaemia	2 (2.7)

BMI, body mass index; CKD, chronic kidney disease; CRT, cardiac resynchronization therapy; CV, cardiovascular; DBP, diastolic blood pressure; HF, heart failure; HR, heart rate; ICD, implanted cardiac defibrillator; LVEF, left ventricular ejection fraction; NYHA, New York Heart Association; SBP, systolic blood pressure.
[a]3 months before starting patiromer treatment.

33.9% of patients reported at least one episode of an adverse event (AE) related to patiromer during the follow-up (*Table 4*). The most frequent were hypomagnesaemia (16.3%), gastrointestinal disturbances (14.9%) and HK (2.8%). Nine patients (12.2%) stopped patiromer during the follow-up due to AE related to the drug. The most frequent cause was gastrointestinal disturbances (66.7%), with no withdrawal related to hypomagnesaemia or K disturbances.

The changes in HF medical treatment were made mainly in the first month after the patiromer introduction. Within the first 3 months, 12.2% of patients started a RAASi, and 20.3% an MRA (*Table 2*). Thirty-five patients (47.3%) increased the dose of RAASi, achieving target doses in 5.4%. Seven patients (9.5%) increase the dose of MRA, achieving target doses in 10.8% (*Table 2*). Twenty-four patients (32.4%) at 30 days and 31 (41.9%) at 90 days did not increase

Table 2 Medical treatment at the beginning and the end of follow-up

Drug	Basal	7 days	30 days	90 days	*P* value
RAASi, *n* (%)	60 (81.1)	69 (93.2)	69 (93.2)	69 (93.2)	0.001
Maximum dose, *n* (%)	12 (16.2)			16 (21.6)	
Mean target dose[a] (%)	41 (32)			62 (24)	0.001
Starting RAASi, *n* (%)		7 (9.5)	2(2.7)	0 (0)	0.001
Increase in RAASi dose, *n* (%)		9(12.2)	18(24.3)	8(10.8)	
MRA, *n* (%)	36(48.6)	47 (63.5)	50 (67.6)	51 (68.9)	0.001
Maximum dose, *n* (%)	7 (9.5)			15(20.3)	0.001
Mean target dose[a] (%)	26 (33)			73 (30)	0.001
Starting MRA, *n* (%)		11(14.9)	3(4.1)	1(1.4)	
Increase in MRA dose, *n* (%)		3(4.1)	2(2.7)	2(2.7)	
Increase in RAASi and MRA doses, *n* (%)		2(2.7)	0 (0)	1(1.4)	
Beta-blocker, *n* (%)	71 (96.0)				
Furosemide, *n* (%)	48 (64.9)				
Daily dose (mg)	75.7 (41.5)				
Thiazides, *n* (%)	9 (12.2)				
SGLT2i, *n* (%)	14 (18.9)				

MRA, mineralocorticoid receptor antagonists; RAASi, renin–angiotensin–aldosterone system inhibitors; SGLT2i, sodium-glucose cotransporter type 2 inhibitors.
[a]Mean target dose refers to the percentage of the target dose achieved according to clinical guidelines. It is expressed as the mean target dose (%) and the standard deviation.

Table 3 Analytic parameters evolution during the follow-up

Parameter	Basal	7 days	30 days	90 days	p-value
Cr[a] (mg/dL)	2.1 (1.6)	2.0 (1.6)	2.1 (1.6)	2.1 (1.7)	0.83
Cr[b] (mg/dL)	2.2 (1.9)			2.2 (1.9)	0.37
eGFR[a] (mL/min)	41.1 (19.8)	42.7 (21.5)	43.0 (21.8)	44.6 (22.8)	0.07
eGFR[b] (mL/min)	39.6 (20.4)			42.7 (23.2)	0.005
Urea[a] (mg/dL)	104.7 (59.2)	111.4 (69.2)	111.0 (69.0)	113.0 (81.0)	0.76
Urea[b] (mg/dL)	99.2 (54.0)			110.6 (71.1)	0.17
Na[a] (mEq/L)	139.2 (3.3)	140.0 (3.6)	139.8 (3.0)	139.9 (3.2)	0.33
Na[b] (mEq/L)	139.3 (3.1)			139.6 (3.2)	0.46
K[a] (mEq/L)	5.5 (0.6)	4.9 (0.8)	4.9 (0.6)	4.9 (0.5)	0.001
K[b] (mEq/L)	5.5 (0.6)			4.9 (0.4)	0.001
Mg[c] (mg/dL)	1.9 (0.4)	1.9 (0.5)	1.7 (0.4)	1.9 (0.3)	0.09
Mg[d] (mg/dL)	1.8 (0.3)			1.8 (0.4)	0.33

Cr, creatinine; eGFR, estimated glomerular filtration rate; K, potassium; Mg, magnesium; Na, sodium; NTproBNP, *N*-terminal prohormone of brain natriuretic peptide.
[a]ANOVA repeated measures considering 46 subjects with all available measures.
[b]Student's *t*-test for initial and final related samples available in 61 subjects.
[c]ANOVA repeated measures considering eight subjects with all available measures.
[d]Student's *t*-test for initial and final related samples available in 15 subjects.

drugs doses because of other causes than HK (more frequently hypotension and kidney failure).

Clinical events were not frequent during the follow-up (*Table 4*). Nearly 7% of patients visited the emergency room or were admitted to the hospital at 30 days and 9.5% at 90 days. Only one patient had an HK episode treated in the emergency room. Compared with the previous 3-month period before patiromer treatment, the number of hospital admissions (28.4% vs. 10.9%; $P < 0.01$) and emergency room visits (18.9% vs. 5.4%; $P < 0.01$) were significantly reduced. Forty-seven patients (63.5%) did not improve NYHA class at the end of follow-up, three improved (4.1%), and nine deteriorated functional class (12.2%) (*Tables 1 and 4*). The improvement and deterioration of NYHA class only happened in those patients who modified medical treatment.

Discussion

HK is common in HF patients and often limits disease-modifying medical therapy. New K-binders have emerged in recent years, controlling this common complication and allowing better medical management of HF. However, there are little data on their use in clinical practice. This study found that treatment with patiromer normalized K levels at 7 days maintained at 3 months. This treatment was safe and well tolerated, with a similar profile as reported in clinical trials and pharmacovigilance data. In our study, 12.2% of patients started RAASi, and 20.3% MRA during the follow-up, with a significant increase in the percentage of patients in TD (5.4% in RAASi and 10.8% in MRA). At 90-day follow-up, natriuretic peptides values and hospital visits were

Figure 1 Evolution of potassium levels during the follow-up. a = K before patiromer treatment vs. K at 7 days ($P < 0.05$). b = K before patiromer treatment vs. K at 90 days ($P < 0.05$).

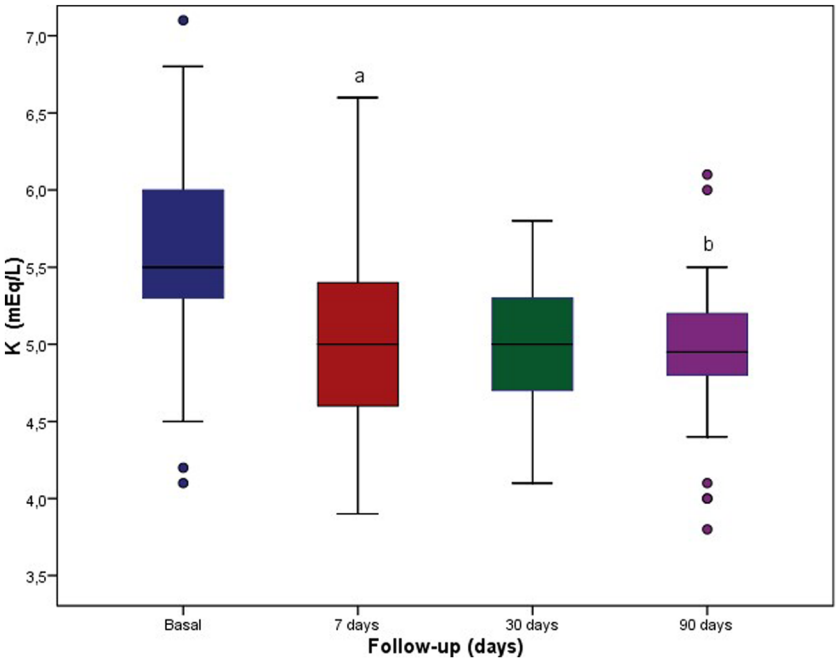

Figure 2 Evolution of NTproBNP levels during the follow-up. a = NTproBNP before patiromer treatment vs. NTproBNP at 90 days ($P < 0.05$).

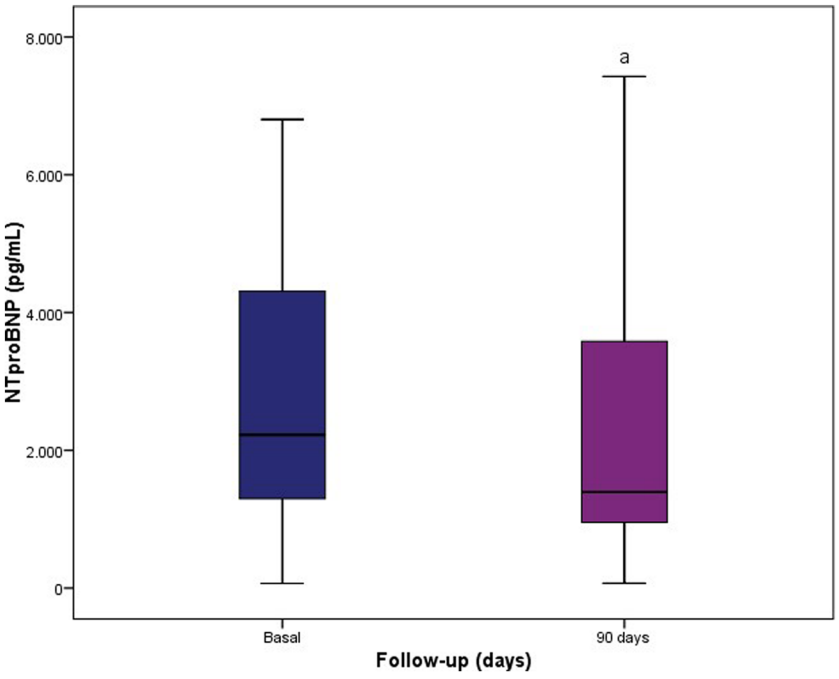

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Table 4 Adverse effects and clinical events related to patiromer during the follow-up

	7 days	30 days	90 days
AE episodes, *n* (%)	14 (18.9)	13(17.6)	14 (18.9)
Gastrointestinal disturbances	4 (5.4)	5(6.8)	5(6.8)
Hypomagnesaemia	7 (9.5)	8 (10.8)	7 (9.5)
Hypokalaemia	2(2.7)	0 (0)	0 (0)
Hypercalcaemia	0 (0)	0 (0)	1 (1.4)
Hyperkalaemia	0 (0)	0 (0)	1 (1.4)
Own patient decision	1 (1.4)	0 (0)	0 (0)
Withdrawal of patiromer, *n* (%)[a]	2(2.7)	2(2.7)	5 (6.8)
AE incidence, *n* (%)[b]	13(17.6)	7 (9.5)	5 (6.8)
Gastrointestinal disturbances	4 (5.4)	3 (4.1)	4 (5.4)
Hypomagnesaemia	7 (9.5)	4 (5.4)	1 (1.4)
Hypokalaemia	2 (2.8)	0 (0)	0 (0)
Patiromer increase dose, *n* (%)	0 (0)	16 (21.6)	3 (4.1)
Clinical events, *n* (%)	0 (0)	5 (6.8)	7 (9.5)
Hospital admission, *n* (%)[c]		3 (4.1)	5 (6.8)
CV causes		1 (1.4)	2(2.7)
Non-CV causes		2 (2.7)	3 (4.1)
Hyperkalaemia		0 (0)	0 (0)
Emergency room visit, *n* (%)		2 (2.7)	2 (2.7)
CV causes		0 (0)	1 (1.4)
Non-CV causes		1 (1.4)	1 (1.4)
Hyperkalaemia		1 (1.4)	0 (0)
Death, *n* (%)		0 (0)	1 (1.4)
Functional class, *n* (%)			
NYHA I			9(12.2)
NYHA II			36(48.6)
NYHA III			15 (20.3)

AE, adverse event; CV, cardiovascular; NYHA, New York Heart Association.

[a]Nine patients (12.1%) discontinued patiromer during the follow-up: six for gastrointestinal causes (one of them changed to CZS with good tolerance and no new HK); one for own patient decision without no new HK episodes during the follow-up; one for hypercalcaemia; one for HK, with a change to CZS.

[b]Considering only one episode for each patient.

[c]Distribution according to optimization of medical treatment during the follow-up: (i) patients who changed treatment: two CV episodes, two non-CV and one hyperkalaemia; (ii) patients who did not change treatment: two CV episodes, five non-CV and one death (non-CV death in a patient admitted to hospital).

reduced, suggesting a clinical benefit of optimizing HF medical treatment.

The evidence-guided treatment at TD, including RAASi and MRA, is recommended to reduce mortality and HF admission.[2] In our cohort, although 81.1% of patients received an RAASi, only 16.2% were in TD. In MRA, the rate was lower, with only 48.6% of patients receiving treatment and 9.5% in TD. Some studies previously showed the undertreatment of HF patients in real life, frequently due to drugs AE, renal function impairment and therapeutic inertia, impacting prognosis. In the European Society of Cardiology (ESC) HF Long-Term Registry, including 12 440 patients, 89% received RAASi, but only 29% were in TD, and 59% an MRA (31% TD).[3]

HK is a common cause of not optimizing medical treatment, especially MRA, as 54.1% of our patients had reduced HF medical treatment and 36.5% stopped some specific drug due to HK in the previous year. In a subanalysis of ESC HF Long-Term Registry concerning only Spanish hospitals,[9] including 3587 patients, K was responsible for 5% of patients not having TD and 14% not taking RAASi. In MRA, 15% did not receive TD, and around 30% were not taking them because of HK. In our experience, the control of K with patiromer helps to optimize treatment, especially during the first month, as almost 55.4% of patients changed medical treatment since patiromer treatment. The number of patients treated with RAASi increased by 12.2% and MRA by 20.3%. Also, the percentage of patients in TD increases by 5.4% in RAASi and 10.8% in MRA, considering that up to 50% of patients had limited drugs optimization due to other causes, especially hypotension and CKD.

Clinical guidelines recommend starting or increasing RAASi and MRA with a K between 4 and 5 mEq/L and patients with a range between 5.1 and 6.0 mEq/L associating a K-binder. Traditional resins must be avoided due to the published cases of intestinal necrosis, the risk of congestion due to Na exchange and poor gastrointestinal tolerance.[11,13,21,22] Only 20% of our patients received resins before starting patiromer. In our study, K is reduced by 0.6 mEq/L at 7 days, and K levels were maintained in the normal range at 90 days. Some studies have demonstrated that patiromer reduced K levels in 48–72 h and remained stable in the long-term.[17,19,23] In the AMETHYST-DN trial, which included 306 patients with CKD, diabetes and/or HF, the reduction of K was 0.5 mEq/L at 4 weeks in mild HK, with normal-ranged values at 52 weeks. It is essential to maintain patiromer to control K because its withdrawal is related to new HK, which impacts prognosis.[8,17]

Patiromer was safe in clinical practice, with a lower incidence of non-serious AE than reported in other studies (33.9% vs. 47–62%).[16,18,19,23] Rossignol *et al*. published an article comparing all data obtained from the clinical trial programme, including 666 patients,[16,17,19,24] and data from the global pharmacovigilance database over 4 years (2016–2019), including 45 000 patient-years.[25] This report's most common non-serious AE were gastrointestinal disturbances (18% in clinical programme and 15% in pharmacovigilance data), similar to our cohort (14.9%). Like other studies, most AE were mild[25] and was detected in the first month of patiromer treatment.[23]

In our study, hypomagnesaemia was more frequent than in the Rossignol *et al*. study (16.3% vs. 6% in the clinical programme), although conclusions were interfered by most of our patients had not Mg close monitoring. The periodical control of Mg and the other electrolytes is recommended in HF patients.[11,13,26] Although hypomagnesaemia related to patiromer used to be mild and did not carry to cardiac arrhythmias, it is recommended to supplement in cases with Mg $<$ 1.5 mg/dL.[9,26] The incidence of HK is also very low (5% in the clinical programme, 0.5% in pharmacovigilance data and 2.8% in our cohort), and only one case had to be resolved in the emergency room. The incidence of serious AE, none of them related to patiromer, was also very low in our study, similar to that reported by Rossignol *et al*.

(6% hospitalization in pharmacovigilance data vs. 6.8% at 90 days in our cohort).

The possibility of optimizing K management with patiromer and subsequent HF treatment optimization may impact prognosis. Our study showed that natriuretic peptide values were reduced, and hospitalization and emergency room visits decreased, suggesting a clinical benefit of HF medical treatment optimization in the short term. Interestingly, there was a trend to improve renal function, considering that almost 70% of our patients had CKD. We have limited clinical events' impact data, with a similar rate reported in other studies but a short follow-up. The DIAMOND-HF trial (NCT03888066) [*Patiromer for the Management of Hyperkalemia in Subjects Receiving RAASi Medications for the Treatment of Heart Failure*] will not answer this question due to a recent change in the primary endpoint. Another ongoing international registry, the CARE HK in HF, evaluates the real-life factors that influence RAASi treatment in patients with HF and HK and the impact on outcomes.

Our study has some limitations. First of all, there were some missing visits or incomplete data collection during follow-up related to a retrospective registry's research nature. Second, no specific follow-up protocol was performed according to usual clinical practice. However, this makes it a registry that realistically shows the multicentre experience with patiromer in actual practice. Third, we analysed the short-term management of patiromer and had no data about the potential reduction of clinical events related to long-term drug improvements. Finally, the sample size is small to conclude that patiromer impacts clinical outcomes, although this is the higher cohort of patients of patiromer published in real life.

Conclusions

Potassium was normalized during the K-binder patiromer treatment in our cohort, with a safety profile similar to clinical trials and pharmacovigilance data. Patiromer was helpful to optimize HF treatment, significantly increasing the percentage of patients treated with RAASi and MRA and the number of patients in TD. At the end of follow-up, natriuretic peptides values and hospital visits were reduced, which may be related to K management and medical optimization.

Conflict of interest

AEF declares to have received fees for presentations and participation as an expert in the Advisory Board from AstraZéneca and Vifor Pharma. None of the authors declare conflicts of interest.

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