Original research

doi: http://dx.doi.org/10.22265/acnef.6.1.323

Clinical evolution of patients treated with sucroferric oxyhydroxide in hemodialysis

Evolución clínica de pacientes en hemodiálisis en tratamiento con oxihidróxido sucroférrico

Antonio José Marín Franco, Gonzalo Delgado Lapeira, Hijazi Prieto Badawi, José Javier Santos Barajas, Rami Ghais Fernández, Gabriel Yépez León, Magdalena Redondo Terán, Pedro Abáigar Luquín

Nephrology Service, University Hospital of Burgos, Burgos, Spai

Resumen

Introducción: la hiperfosfatemia es una complicación común de la enfermedad renal crónica (ERC) y empeora progresivamente a medida que disminuye la función renal. Actualmente disponemos de diversas moléculas farmacéuticas para su tratamiento. Dentro de ellas, existen quelantes que contienen hierro, como es el caso del oxihidróxido sucroférrico. Su uso se ha extendido fundamentalmente entre pacientes en hemodiálisis, en sustitución de otros quelantes.

Objetivo: describir la tolerabilidad, la aparición de efectos secundarios, la adherencia terapéutica y las cifras de fósforo sérico en pacientes en tratamiento con oxihidróxido sucroférrico en nuestro centro.

Materiales y métodos: se analizaron 5 pacientes de la unidad de hemodiálisis del Servicio de Nefrología del Hospital Universitario de Burgos, España, en el periodo comprendido entre enero de 2017 a mayo de 2018, todos ellos en tratamiento con oxihidróxido sucroférrico. Se evaluaron las concentraciones plasmáticas de fósforo, calcio y hormona paratiroidea durante el tratamiento con oxihidróxido sucroférrico, además de los efectos secundarios y las causas de abandono. El análisis de los datos se realizó mediante el software estadístico IBM SPSS 22 con un intervalo de confianza del 95 %. Se evaluaron las posibles diferencias con el análisis de la t-Student.

Resultados: se evidenció una reducción media del 12,27 % de la hiperfosforemia y una reducción en el número de comprimidos diarios del 15,79 %, con buena tolerancia del fármaco en todos los casos. No se evidenció reducción estadísticamente significativa en los niveles plasmáticos de calcio, ni de hormona paratiroidea (PTH).

Conclusiones: el oxihidróxido sucroférrico es un fármaco bien tolerado, que generó una disminución de los niveles séricos de fósforo en la población estudiada. Sin embargo, dado el bajo número de casos analizados, no es posible recomendar el uso terapéutico de este fármaco como primera línea de tratamiento de la hiperfosforemia.

Palabras clave: oxihidróxido sucroférrico, hemodiálisis, hiperfosforemia, metabolismo óseo mineral, quelantes.

doi: http://dx.doi.org/10.22265/acnef.6.1.323

Abstract

Introduction: Hyperphosphatemia is a common complication of CKD and progressively worsens as renal function decreases. Currently we have several pharmaceutical molecules for its treatment. Among them, there are chelators that contain iron, as is the case of sucroferric oxyhydroxide. Its use has been extended mainly among those on hemodialysis, replacing other chelators.

Objective: Describe the tolerability, the appearance of side effects, therapeutic adherence and serum phosphorus levels in patients undergoing treatment with sucroferric oxyhydroxide in our center.

Materials and methods: Five patients were analyzed from the hemodialysis unit of the Nephrology Service of the University Hospital of Burgos, from January 2017 to May 2018, all of them under treatment with sucroferric oxyhydroxide. Plasma concentrations of phosphorus, calcium and parathyroid hormone were evaluated during treatment with sucroferric oxyhydroxide, in addition to side effects and causes of abandonment. For the analysis of the data, they were processed using the IBM SPSS 22 statistical software with a confidence interval of 95%. Possible differences were evaluated with the t-Student analysis.

Results: There was an average reduction of 12.27% in hyperphosphatemia and a reduction in the number of daily tablets of 15.79%, with good tolerance of the drug in all cases. There was no statistically significant reduction in plasma levels of calcium or parathyroid hormone (PTH).

Conclusions: Sucroferric oxyhydroxide is a well-tolerated drug, which generated a decrease in serum phosphorus levels in the population studied. However, given the low number of cases analyzed, it is not possible to recommend the therapeutic use of this drug as the first line of treatment for hyperphosphatemia.

Key words: Sucroferric oxyhydroxide, hemodialysis, hyperphosphatemia, mineral bone metabolism, chelators.

doi: http://dx.doi.org/10.22265/acnef.6.1.323

Citation: Marín Franco AJ, Delgado Lapeira G, Prieto Badawi H, Santos Barajas JJ, Ghais Fernández R, Yépez León G, et al. Evolución clínica de pacientes en hemodiálisis en tratamiento con oxihidróxido sucroférrico. Rev. Colomb. Nefrol. 2019;6(1):28-34. doi: http://dx.doi.org/10.22265/acnef.6.1.323

Correspondence: Antonio José Marín Franco, amarinf@saludcastillayleon.es

Received: 08.10.18 • **Accepted:** 15.01.19 28

http://dx.doi.org/10.22265/acnef.6.1.323

Introduction

The phosphorus balance is a key component of the mineral and bone homeostasis; and it is altered in patients with chronic kidney disease (CKD). The phosphorus excess is a risk factor in the occurrence of cardiovascular disease or events and is associated with increased mortality[1-3].

It should be noted that the initial treatment of hyperphosphatemia in CKD is based on dietary changes. However, this measure is ineffective when the deterioration of renal function progresses, which is why, among other medical treatments, phosphorus binders are used to achieve the therapeutic objective recommended by the KDIGO guidelines, of a phosphorus level of less than 5.5mg/dl[1,3].

Within the therapeutic arsenal, we currently have calcium phosphate binders such as calcium carbonate and calcium acetate; and non-calcium based phosphate binders, such as aluminum salts, sevelamer hydrochloride (Renagel), sevelamer carbonate (renvela), lanthanum carbonate (fosrenol) and iron-containing chelators such as sucroferric oxyhydroxide (velphoro)[1,3].

Different studies have compared the different phosphate binders in dialysis patients without identifying a clear superiority of any of them[1-4].

In phase III studies and in patients in hemodialysis, sucroferric oxyhydroxide has demonstrated an effect similar to that of sevelamer carbonate, with improvement in transferrin saturation (4 %), reduction in the needs for intravenous iron supply, and fewer tablets per day[5,6]. However, it has one of the highest discontinuation rates, due to the intolerance of the patient, particularly by gastrointestinal symptomatology[1].

The main objective is to describe the tolerability, the appearance of side effects, the therapeutic adherence and the serum phosphorus levels in patients treated with sucroferric oxyhydroxide in our center.

Materials and methods

Five patients from the hemodialysis unit of the Nephrology Service of the University Hospital of Burgos, in the period between January 2017 and May 2018 were included, all of them under treatment with sucroferric oxyhydroxide. The data were collected through the Nefrolink informatic system.

The data analysis was processed using the IBM SPSS 22 statistical software, with a 95 % confidence interval. Means and standard deviations were used for the relationship between variables, which maintain a normal distribution. The possible differences were evaluated with parametric tests, specifically with the t-Student analysis.

Low doses of the drug were administered in all cases to avoid possible side effects.

Results

The average age of the patients is 72.4 ± 9.2 years, 3 women and 2 men, all of them on hemodialysis.

In 40% of the cases the drug was started as a substitute for sevelamer carbonate due to intolerance to the latter, and in the rest of the cases as an additional measure for the control of the hyperphosphatemia (Table 1).

Two patients had soft semiliquid stools during the first 2 weeks of treatment with sucroferric oxyhydroxide, with improvement in the clinical picture after reducing the dose administered. There was no abandonment of the treatment.

A statistically significant reduction in the plasma calcium levels or in parathyroid hormone (PTH) was not evidenced. It was achieved an average reduction of 12.27% in the phosphatemia values, with a mean phosphorus of 4.86 ± 0.39 and a reduction in the number of daily tablets of 15.79%, with non-significant differences in both of them (Figures 1, 2, 3 and 4)

http://dx.doi.org/10.22265/acnef.6.1.323

Table 1. Comparison between different clinical courses.

Parameters	Case 1	Case 2	Case 3	Case 4	Case 5
Age	86	66	66	78	66
Gender	Woman	Woman	Man	Woman	Man
Initial non-calcium based phosphate binder	Sevelamer carbonate (2.4 gr/day)	Sucroferric oxyhydroxide (1 gr/day)	Sucroferric oxyhydroxide (500 mg/day)	Sevelamer carbonate (4.8 gr/day)	Sucroferric oxyhydroxide (1 gr/day)
Cause of abandonment	Discomfort with the flavor of the drug and constipation	Does not apply	Does not apply	Diarrhea, increased flatulence	Does not apply
Phosphate binder used in second instance	Sucroferric oxyhydroxide (1 gr/day)	Does not apply	Does not apply	Sucroferric oxyhydroxide (1 gr/day for 2 months, subsequently 500 mg/day)	Does not apply
Time of treatment with sucroferric oxyhydroxide	9 months	5 months	6 months	6 months	12 months
Mean phosphorus levels (SD)	4.6±0.36	5.2±1.35	4.3±1.97	5.1±1.03	5.1±0.47
Mean calcium levels (SD)	8.6±0.55	9.1±0.30	8.2±0.25	8.7±0.37	9.13±0.68
Mean PHT levels (SD)	245±63.52	342±119	363±68.24	98.9±32.15	200.37±110.29

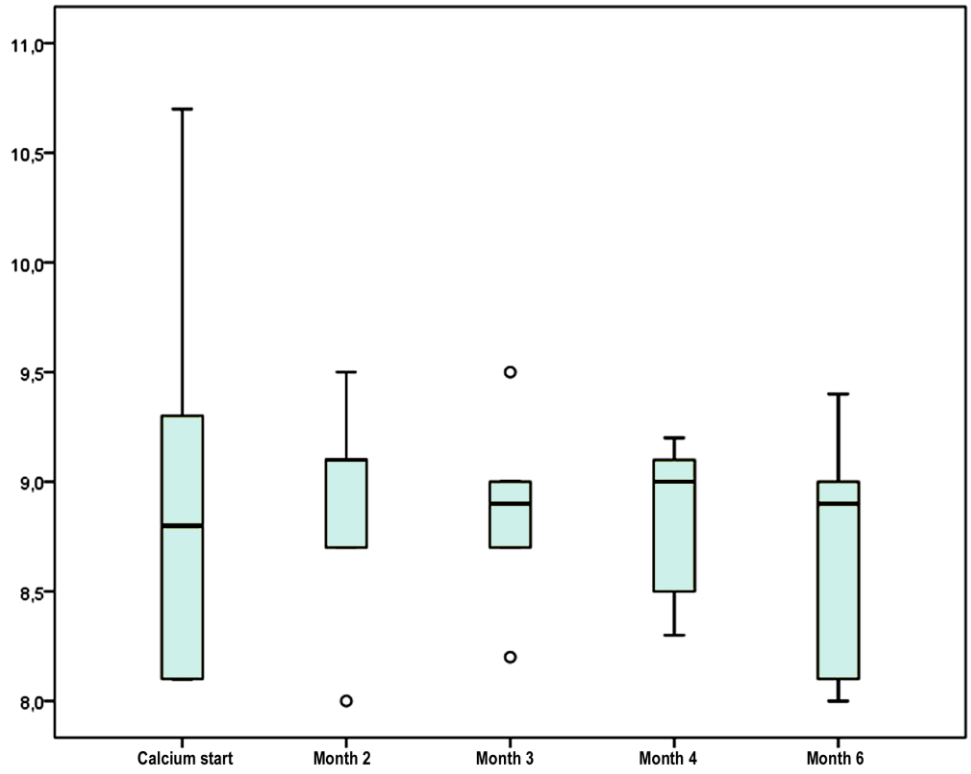

Figure 1. Variation in plasma calcium levels during treatment with sucroferric oxyhydroxide.

http://dx.doi.org/10.22265/acnef.6.1.323

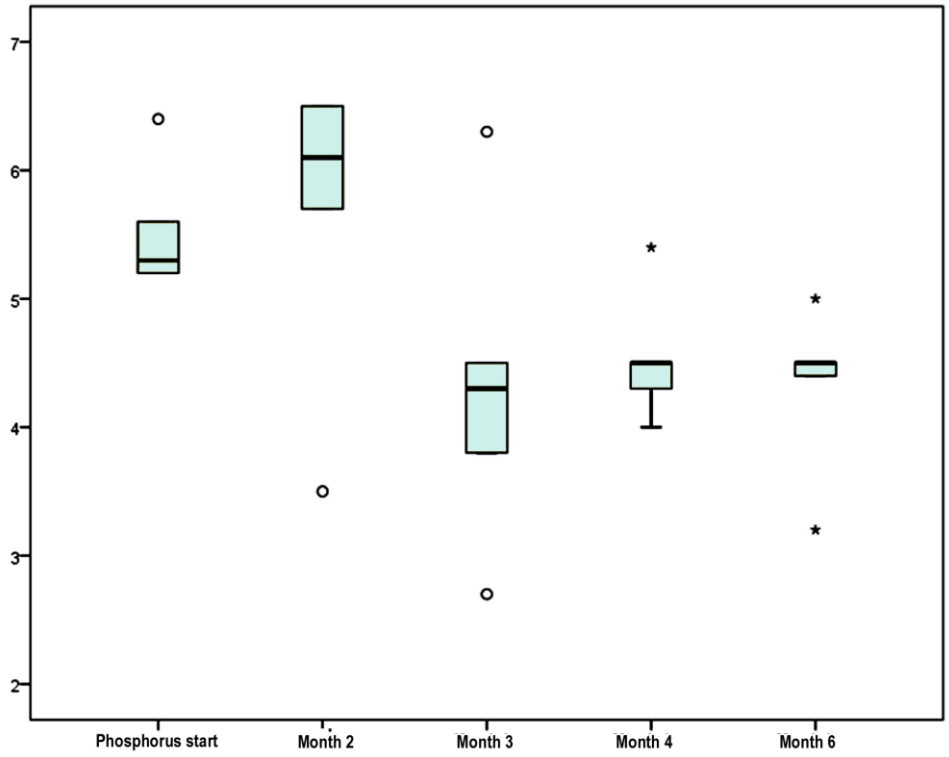

Figure 2. Variation in plasma phosphorus levels during treatment with sucroferric oxyhydroxide.

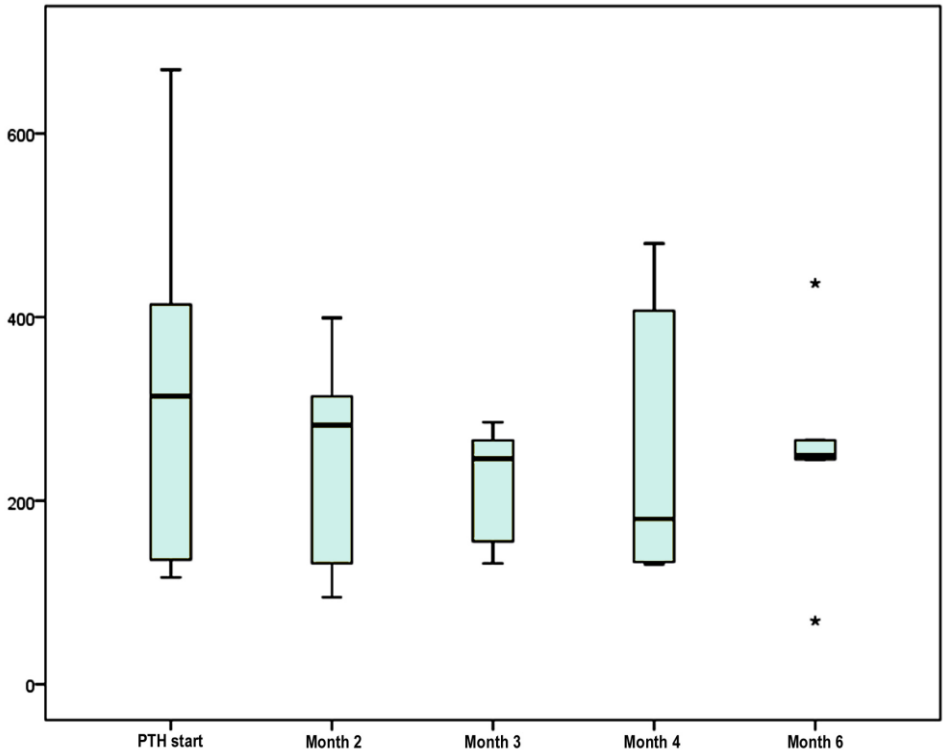

Figure 3. Variation in plasma PTH levels during treatment with sucroferric oxyhydroxide.

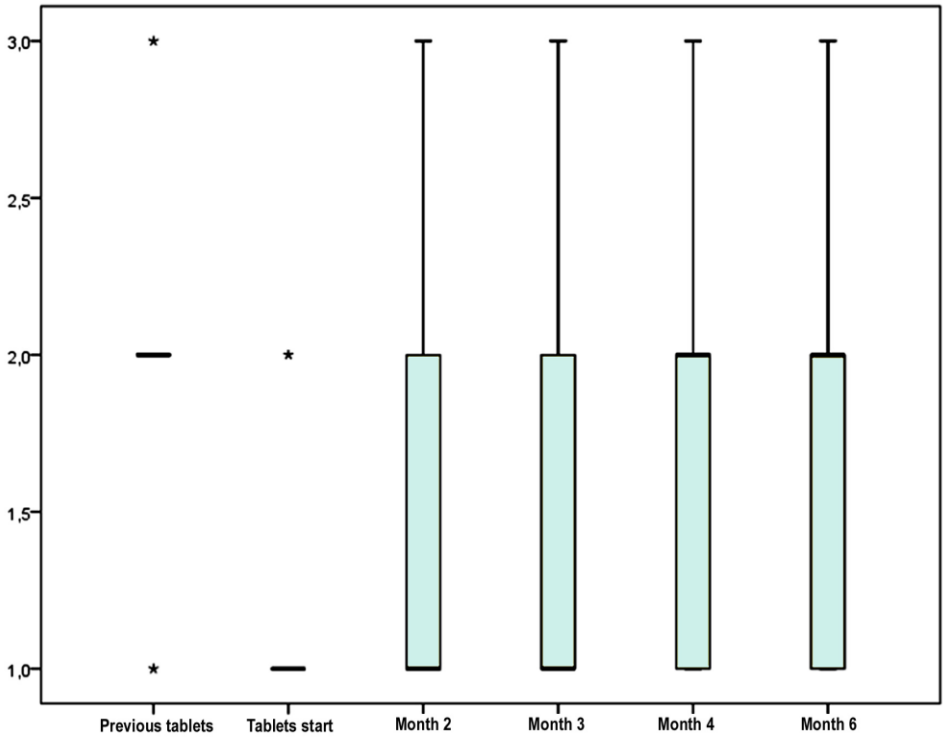

Figure 4. Variation in the number of tablets of phosphate binders taken by the patient during treatment with sucroferric oxyhydroxide.

Conclusions

The main challenge in the long-term reduction of serum phosphorus with phosphate binders is the lack of adherence to the medication. It is necessary to inquire in the anamnesis the compliance and the causes of the suspension. Sucroferric oxyhydroxide is a valid therapeutic option which, although it has presented one of the highest discontinuation rates, is very effective in the control of hyperphosphatemia. Its use at low doses manages to reduce the adverse effects and improves tolerance, and in association with other chelators shows good control of phosphorus with fewer tablets per day, thus improving therapeutic compliance[5].

Despite the good evolution of the described patients, it is necessary to perform randomized, well-designed, long-term, controlled comparative trials that evaluate the effectiveness and efficiency of the different phosphate binders commonly used, in order to be able to recommend one of them as first therapeutic option[1,5,6].

Conflict of interest

The authors declare that they have no potential conflicts of interest related to the contents of this article.

Ethical responsibilities

Protection of people and animals

The authors declare that no experiments were performed on human beings or animals for this research.

Data confidentiality

The authors declare that they have followed the protocols of their workplace on the publication of patient data.

http://dx.doi.org/10.22265/acnef.6.1.323

Right to privacy and informed consent

The authors declare that patient data do not appear in this article

Contribution of the authors

Marín FrancoAntonio José: main researcher.

Delgado Lapeira Gonzalo: edition of the article, treating physician of some of the patients presented.

Hijazi Prieto Badawi: edition of the article, treating physician of some of the patients presented.

Santos Barajas José Javier: collaborator.

Ghais Fernández Rami: collaborator.

Redondo Terán Magdalena: collaborator.

Yépez León Gabriel: collaborator.

Abáigar Luquín Pedro: collaborator.

References

1. Peter WL, Wazny LD, Weinhandl E, Cardone KE, Hudson JQ. 2017. A Review of Phosphate Binders in Chronic Kidney Disease: Incremental Progress or Just Higher Costs? Drugs. 2017;77(11):1155-1186. https://doi.org/10.1007/s40265-017-0758-5
2. Block GA, Klassen PS, Lazarus JM, Ofsthun N, Lowrie EG, Chertow GM. Mineral metabolism, mortality, and morbidity in maintenance hemodialysis. J Am Soc Nephrol. 2004; 15:2208-18. https://doi.org/10.1097/01. ASN.0000133041.27682.A2
3. Kidney Disease: Improving Global Outcomes (KDIGO) CKDMBD Work Group. KDIGO clinical practice guideline for the diagnosis, evaluation, prevention, and treatment of chronic kidney disease-mineral and bone disorder (CKD-MBD). Kidney Int Suppl. 2009;76(113):S24
4. Navaneethan SD, Palmer SC, Craig JC, Elder GJ, Strippoli GF. Benefits and harms of phosphate binders in CKD: a systematic review of randomized controlled trials. Am J Kidney Dis. 2009;54:619-37. https://doi.org/10.1053/j.ajkd.2009.06.004
5. Floege J, Covic AC, Ketteler M, Mann JF, Rastogi A, Spinowitz B, et al. Long-term effects of the iron-based phosphate binder, sucroferric oxyhydroxide, in dialysis patients. Nephrol Dial Transplant. 2015;30(6):1037-46. https://doi.org/10.1093/ndt/gfv006
6. Koiwa F, Yokoyama K, Fukagawa M, Terao A, Akizawa T. Efficacy and safety of sucroferric oxyhydroxide compared with sevelamer hydrochloride in Japanese haemodialysis patients with hyperphosphataemia: a randomised, open-label, multicentre, 12-week phase III study. Nephrology (Carlton). 2017;22(4):293-300. https://doi.org/10.1111/nep.12891.