

Hemodiafiltration, an opportunity for life, to create life: A case report


José Dorta Díaz¹, Harold Alvarez¹ , Mariant Jenifer Borges Colina¹, Juan Perez Chill¹, Verónica Alvarado Ereú¹, Pedro Amador Guillen¹

1. Unidad de diálisis, RenalPro, Milagro, Guayas-Ecuador.

Abstract

Received: November 5, 2022
Accepted: January 30, 2023
Published: February 28, 2023
Editor: Dr. Franklin Mora Bravo.

Cite:
Dorta Díaz J, Alvarez H, Borges C, Perez J, Alvarado V, Amador P. Hemodiafiltration, an opportunity for life, to create life: A case report. REV SEN 2023;11(1):25-29. DOI: <http://doi.org/10.56867/45>

 Copyright Dorta Díaz J, et al. This article is distributed under the [Creative Commons CC BY-NC-SA 4.0 Attribution License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows the use and redistribution citing the source and the original author for noncommercial purposes.

Introduction: The possibility of achieving a pregnancy in women with lupus nephropathy undergoing hemodialysis treatments is very low, between 0.4% and 1.4%.

Clinical case: A 27-year-old woman with lupus nephropathy who, during the hemodialysis program, was diagnosed with a high-risk 7-week pregnancy. The modality was changed to daily postdilution Hemodiafiltration (HDF) with an extracorporeal flow of 450 ml/min. She received aspirin 100 mg QD, calcium carbonate 1 g PO Qd, and alpha methyldopa 250 mg every 8 hours until week 37. 13 prenatal check-ups were performed. The usual ultrafiltration was 500 ml per treatment. The dry weight at the beginning of the pregnancy was 91.8 kilos (7th gestational week); at the end, it was 100.0 kilos.

Evolution: A 2200 gr girl was obtained by segmental cesarean section, height: 45 cm, head circumference: 32 cm, abdominal circumference of 27 cm, APGAR score 8-8-9, and Ballard scale of 37 weeks, with the ideal maternal condition without superimposed hypertensive disorders, or events related to active immunity.

Conclusion: In the present case, online postdilution hemodiafiltration therapy was the option for a woman with lupus nephropathy with stage 5-d chronic kidney disease of childbearing age and wishing to become pregnant. Due to the proven advantages of hemodiafiltration due to greater clearance and hemodynamic stability, both maternal and fetal, is recommended as a treatment for high-risk pregnancy.

Keywords:

MESH: Pregnancy; Kidney Dialysis; mortality; Case reports.

* Corresponding author



The impossibility of conception and sterility evidence frequent alterations in the hypothalamic-pituitary-ovarian axis in women with chronic kidney disease. The chance of achieving a pregnancy is 0.4%-1.4% [1]. Additionally, pregnant women with lupus are at increased risk of maternal and fetal adverse outcomes, including increased rates of preterm delivery, stillbirth, intrauterine growth restriction, low birth weight, preeclampsia, and obstetric hemorrhage. Therefore, a patient with lupus nephropathy undergoing optimal renal function replacement therapy could be a good scenario for a risky desired pregnancy. We present the follow-up of a case in this regard.

Clinical case

A 27-year-old woman with chronic kidney disease secondary to systemic lupus erythematosus, which caused class IV lupus nephropathy at 18 years of age. Before renal failure, she underwent pharmacological management with prednisone and hydroxychloroquine. The patient evolved in 10 years with progressive renal damage until renal replacement therapy was needed, with a residual diuresis of >1 liter per day.

The patient was diagnosed with a high-risk pregnancy during the hemodialysis program and monitored from the 7th week. Anatomical ultrasound control was performed at 12 weeks, with an average result (Figure 1).

By prescription of daily ONLINE postdilution hemodiafiltration of 270 minutes/session with an extracorporeal flow of 450 ml/min. Fourteen French fistula needles and dialysis fluid with 1.25 mmol/L calcium and 28 mmol/L sodium bicarbonate mmol/L were used. 2500 IU of unfractionated heparin was used. The average convective volume (substitution + ultrafiltration) was 27 liters in each treatment.

The patient was treated with HDF for 37 weeks. The prescribed medications were aspirin 100 mg QD, calcium carbonate 1 gr PO Qd, and alpha methyl dopa 250 mg every 8 hours until week 37. Thirteen prenatal check-ups were performed, which allowed for maintaining maternal conditions concerning blood volume, blood pressure, and interdialysis weight gain were optimal, with biochemical parameters of hemoglobin, calcium, phosphorus, and urea (Table 1) within normal ranges. The usual ultrafiltration was 500 ml per treatment. The dry weight at the beginning of the pregnancy was 91.8 kilos (7th gestational week); at the end, it was 100.0 kilos.

Segmental cesarean section was performed to obtain a female product (Figure 2), with the following parameters: weight: 2200 gr, height: 45 cm, head circumference: 32 cm, abdominal circumference 27 cm, APGAR 8-8-9 and Ballard scale of 37 weeks (all within normality). Ideal maternal condition without superimposed hypertensive disorders or events related to active immunity.

Figure 1. Obstetric ultrasound of the 1st trimester.

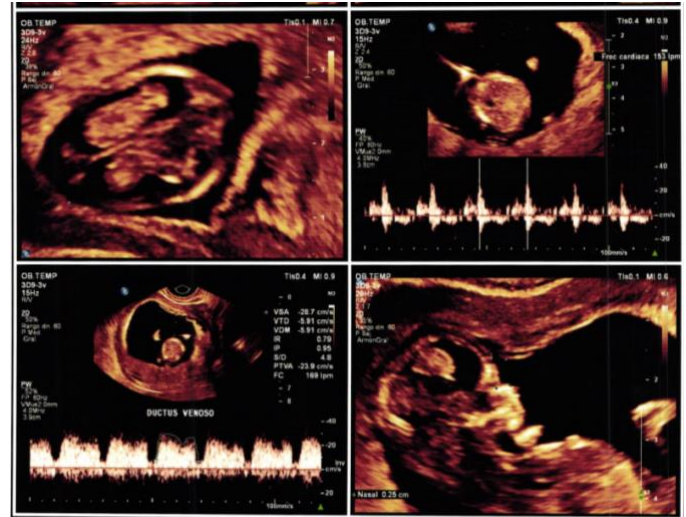


Figure 2. Patient with stage 5d chronic kidney disease in the postpartum period.



**Table 1 .** Biochemical parameters and erythropoietin according to weeks-months of gestation.

Week	Month	Hemoglobin (Mg/Dl)	Hematocrit (%)	Erythropoietin (IU/kgg/Week)	Urea Pre (Mg/dl)	Calcium (mg/dl)	Phosphorus (Mg/dl)
12-13	6	10.2	31.6	60.3	70.7	9.1	3.5
14-17	7	11.6	33.2	67.7	37.7	9.6	2.7
18-21	8	10.6	32	72.4	33.7	8.8	2.9
22-25	9	11.5	33.3	66.4	30.8	8.7	3.0
26-29	10	10.9	32.3	65.6	32.9	8.9	3.0
30-33	eleven	13.3	38.5	46.4	38.5	8.9	3.2
34-37	12	12.1	35	49.4	42.9	8.6	2.5
37	1	11.9	32.6	36.8	37.6	8.6	2.7

Discussion

Although chronic kidney disease conditions successful reproduction, in most women, the increased risk of adverse pregnancy outcomes, both maternal and fetal (fetal death, spontaneous abortion, therapeutic abortion, ectopic or trophoblastic pregnancy, preeclampsia, growth restriction fetal, preterm birth, among the main ones), limits the desire and achievement of pregnancies in dialysis patients [1].

Thermoneutral, isothermal, and isonatric hemodialysis, together with the experience acquired, has made it possible to prescribe dialysis regimens similar to the physiology of healthy people; added to pharmacological and nutritional approaches to pregnant women on dialysis, which has achieved significant improvements in the quality of life and an increase in the success of successful pregnancy.

Online hemodiafiltration (HDF) therapy today represents the most advanced and innovative form of renal replacement therapy. Its superiority over conventional hemodialysis depends on the correct convective dose [2]. Its efficiency is focused on the elimination of uremic compounds of small and medium size [3] and its ability to ensure hemodynamic stability during dialysis, which exerts a protective perfusion effect on the placenta and fetal development.

In the present case, the patient ended her pregnancy without reactivation of her lupus disease, unlike what is often reported in the literature [4-5]. In this case, the high-volume postdilution mode was prescribed due to its benefits, which include better patient survival and cardiovascular outcomes, better intradialysis hemodynamic stability, fewer complications related to inflammation or dialysis, better alteration in phosphate homeostasis of calcium and less vascular calcification better preservation of residual renal function and better quality of life [6-7].

The optimal amount of dialysis time in pregnancy is described as 24 hours per week, with urea levels < 90 mg/dl [8, 9]; in the present case, the patient received 27 hours per week and maintained an average of 40 mg/dl urea, with which the objective of avoiding premature birth and low birth weight was achieved.

Conclusion

In the present case, online postdilution hemodiafiltration therapy was the option for a woman with lupus nephropathy, stage 5-d chronic kidney disease, of childbearing age, and wishing to become pregnant during pregnancy. Due to the proven advantages of hemodiafiltration due to greater clearance and hemodynamic stability, both maternal and fetal hemodiafiltration is recommended as a treatment for high-risk pregnancy.

Abbreviations

HDF: hemodiafiltration.

PO: orally.

QD: every day.

Supplementary information

Supplementary materials have not been declared.

Acknowledgments

We thank all the CorpRenal staff who, through their effort and work, allowed a new human being to be brought into this world, safe and sound.

Author contributions

Jose Antonio Dorta: Data curation, Formal analysis, Fundraising, Research, Methodology, Project management, Resources, Software, Writing – original draft. Juan Carlos Pérez: Conceptualization, Supervision, Validation, Visualization, Writing: review and edition.

Marian Borges: Conceptualization, Supervision, Validation, Visualization, Writing: review and edition.

Pedro Amador: Conceptualization, Supervision, Validation, Visualization, Writing: review and edition.

Verónica Alvarado: Conceptualization, Supervision, Validation, Visualization, Writing: review and edition.

Harold Alvarez: Conceptualization, Supervision, Validation, Visualization, Writing: review and edition.

All authors read and approved the final version of the manuscript.



Financing

The authors provided the costs of the research.

Availability of data or materials

The data sets generated and analyzed during the current study are not publicly available due to participant confidentiality but are available from the corresponding author upon reasonable scholarly request.

Statements

Ethics committee approval and consent to participate

Does not apply.

Consent for publication

The authors have written permission for publication from the patient.

Conflicts of interest

Jose Antonio Dorta is a full-time employee of CorpRenal, acting as medical director. Juan Carlos Pérez, Marian Borges, Pedro Amador, and Verónica Alvarado work at CorpRenal Guayas headquarters. Harold Alvarez declares that he has no conflicts of interest.

References

1. Ribeiro CI, Silva N. Pregnancy and dialysis. *J Bras Nefrol*. 2020 Jul-Sep;42(3):349-356. PMID: 32776086; PMCID: PMC7657054. <https://doi.org/10.1590/2175-8239-jbn-2020-0028>

2. Canaud B, Köhler K, Sichert JM, Möller S. Global prevalent use, trends and practices in hemodiafiltration. *Nephrol Dial Transplant*. 2020 Mar 1;35(3):398-407. doi: 10.1093/ndt/gfz005. PMID: 30768205. <https://doi.org/10.1093/ndt/gfz005>

3. Vermooij RWM, Bots ML, Strippoli GFM, Canaud B, Cromm K, Woodward M, Blankestijn PJ. CONVINCe scientific committee. CONVINCe in the context of existing evidence on hemodiafiltration. *Nephrol Dial Transplant*. 2022 May 25;37(6):1006-1013. PMID: 35098994; PMCID: PMC9130023. <https://doi.org/10.1093/ndt/gfac019>

4. Althaf MM, Abdelsalam MS, Alfurayh OI. Lupus flares in two established end-stage renal disease patients with online hemodiafiltration during pregnancy - case series. *Lupus*. 2014 Aug;23(9):945-8. doi: 10.1177/0961203314530487. Epub 2014 Apr 4. PMID: 24704775. <https://doi.org/10.1177/0961203314530487>

5. Koh JH, Ko HS, Lee J, Jung SM, Kwok SK, Ju JH, Park SH. Pregnancy and patients with preexisting lupus nephritis: 15 years of experience at a single center in Korea. *Lupus*. 2015 Jun;24(7):764-72. Epub 2015 Feb 23. PMID: 25712250. <https://doi.org/10.1177/0961203315572715>

6. Park HC, Lee YK. Who is the winner, pre, post, or mixed-dilution hemodiafiltration? *Kidney Res Clin Practice*. 2021 Sep;40(3):332-334. Epub 2021 Sep 7. PMID: 34510854; PMCID: PMC8476302. <https://doi.org/10.23876/j.krcp.21.172>

7. Schiff H. Online hemodiafiltration and mortality risk in end-stage renal disease patients: A critical appraisal of current evidence. *Kidney Res Clin Practice*. 2019 Jun 30;38(2):159-168. PMID: 31137926; PMCID: PMC6577208. <https://doi.org/10.23876/j.krcp.18.0160>

8. Oliver AL, Hladunewich MA. End-Stage Kidney Disease and Dialysis in Pregnancy. *Adv Chronic Kidney Dis*. 2020 Nov;27(6):477-485. PMID: 33328064; PMCID: PMC7781109. <https://doi.org/10.1053/j.ackd.2020.06.001>

9. Wiles K, Chappell L, Clark K, Elman L, Hall M, Lightstone L, Mohamed G, Mukherjee D, Nelson-Piercy C, Webster P, Whybrow R, Bramham K. Clinical practice guidelines on pregnancy and kidney disease. *BMC Nephrol*. 2019 Oct 31;20(1):401. PMID: 31672135; PMCID: PMC6822421. <https://doi.org/10.1186/s12882-019-1560-2>

DOI: Digital Object Identifier. PMID: PubMed Identifier.

Editor's Note

The REV SEN remains neutral concerning jurisdictional claims over published maps and institutional affiliations.