

Original article

Frequency and Outcome of Pregnancy in Women after Commencing Maintenance Hemodialysis in Sub-Saharan Africa: An Observation from a Single Center

Fréquence et issue des grossesses des femmes hémodialysées chroniques dans un centre d'hémodialyse au Cameroun

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ABSTRACT

PURPOSE / AIM

Improved dialysis care and adequate healthcare resources, have led to better pregnancy outcomes in hemodialysis-dependent women of the middle and high-income countries. In resource-limited regions where inadequacy of dialysis is frequent, data on pregnancy in this population is scarce.

METHODS

We reviewed records of all women of child-bearing age who were treated by maintenance hemodialysis to identify those who became pregnant after commencing maintenance hemodialysis at the Yaounde General Hospital (Cameroon) from November 2002 to 31st December 2013. Characteristics of women who became pregnant and pregnancy data were collected and analyzed.

RESULTS

During the study period of 11 years, six pregnancies occurred in four (4.8%) of 84 women aged between 14-44 years giving a cumulative incidence of 7.14%. All pregnancies were unplanned and unexpected. The mean age of pregnant women was 30 ± 5.47 years, mean dialysis vintage 39.5 ± 26.24 months, and the mean gestational age at diagnosis of pregnancy was 15.8 ± 4.02 weeks. Three of the pregnancies occurred in anuric women, while 5 of the pregnancies occurred in women with regular menstruation. The pregnancies resulted in 4 (66.7%) spontaneous abortions (12, 16 and 19 weeks), one (16.7%) elective abortion (14 weeks), and one (16.7%) live preterm birth at 34 weeks gestation.

CONCLUSION

Pregnancy is rare but possible in dialysis-dependent women receiving suboptimal hemodialysis care. The high frequency of unplanned pregnancies observed, calls for the inclusion of preconception counseling in the care package of young ESRD women in resource-limited settings.

KEY WORDS:

Pregnancy, maintenance haemodialysis, sub-Saharan Africa

RÉSUMÉ

OBJECTIFS

L'amélioration de la qualité de dialyse dans les pays industrialisés a révolutionné le pronostic des grossesses des hémodialysées chroniques. Dans les régions à ressources limitées, la dialyse inadéquate est fréquente et les données sur les grossesses dans cette population sont rares.

MÉTHODES

De novembre 2002 au 31 décembre 2013, nous avons conduit une étude rétrospective chez les hémodialysées chroniques en âge de procréer à l'Hôpital Général de Yaoundé (Cameroun) afin d'évaluer la survenue de grossesse après la mise en hémodialyse.

RÉSULTATS

Durant la période d'étude de 11 ans, 6 grossesses ont été enregistrées chez 4 (4,8%) des 84 femmes âgées de 14-44 ans, soit une incidence cumulative de 7,14%. Toutes les grossesses étaient non désirées et non planifiées. L'âge moyen des femmes enceintes était de 30 ± 5,47 ans. La durée moyenne en dialyse était de 39,5 ± 26,4 mois. L'âge gestationnel moyen au diagnostic de la grossesse était de 15,8 ± 4,02 semaines. Trois grossesses ont été notées chez des patientes anuriques, et 05 grossesses étaient chez les femmes ayant des cycles menstruels réguliers. Les grossesses ont abouti à 04(66,7%) avortements spontanés (12, 16,19 semaines), 01(16,7%) interruption volontaire de grossesse (14 semaines), et 01(16,7%) accouchement prématuré à 34 semaines avec un bébé vivant..

CONCLUSION

Les grossesses sont rares mais possibles chez les hémodialysées chroniques recevant un traitement sous optimal. La fréquence élevée des grossesses non désirées exige l'introduction de la consultation préconceptionnelle dans la prise en charge des jeunes hémodialysées dans les pays à ressources limitées.

MOTS CLÉS

Grossesse- hémodialyse chronique- Afrique Sub-saharienne

INTRODUCTION

Pregnancy in women on maintenance hemodialysis is a rare and challenging medical condition with an estimated prevalence of less than 7% [1–5]. Infertility in ESRD is attributed to sexual dysfunction and abnormalities of the hypothalamic-pituitary-ovarian axis induced by uremia [6–8]. Improved dialysis efficiency, erythropoietin use and adequate resources have increased conception and live birth rates over time in middle and high income regions [6,9–18]. Many sub-Saharan African countries still lack renal replacement therapy despite the significant growth in maintenance hemodialysis facilities recorded in recent years [19]. When available, inadequate state funding for healthcare and the absence of a third-payer system does not allow for efficient dialysis or the use of substitutive therapies for the correction of anemia and mineral bone disorders [19–21]. Pregnancy outcomes may thus differ in this region. With the paucity of data on pregnancy in hemodialysis-dependent women in sub-Saharan Africa [22], we reviewed the characteristics and outcome of all pregnancies which occurred over a period of 11 years in a single hemodialysis facility in Cameroon

PATIENTS AND METHODS

Study setting: The Yaounde General Hospital hemodialysis center is a public hemodialysis facility situated in a tertiary hospital. It was established in November 2002 with 6 hemodialysis machines using modified cellulose dialyzers and acetate dialysate, thus the number of generators (Fresenius Medical Care Homburg, Germany) increased to 12 in August 2006 and later to 20 in May 2013. Since August 2006, the center uses polysulfone dialyzers with bicarbonate dialysate. Both acute and chronic patients are treated in the center. About 98% of patients undergo two 4-hour dialysis sessions per week. The center runs 3-4 dialysis shifts a day. Anemia is usually corrected by blood transfusions but recombinant erythropoietin is available for those who can afford it. The center has 2 nephrologists and 14 nurses. Hemodialysis therapy is subsidized in part by the state. Limited specialized obstetrical and neonatal services are also available in the hospital.

Data collection: We retrospectively analyzed the records of women aged 14-44 year who were treated by maintenance hemodialysis for end-stage renal disease became pregnant from November 2002 to 31st December 2013. The number of pregnancies which occurred during the study period was noted. The diagnosis of pregnancy was based on a history of amenorrhea, raised serum β -HCG levels and uterine

ultrasound findings or the occurrence of a spontaneous abortion (confirmed by a gynecologist).

Patient data included age, underlying kidney disease, urine output, gravidity, parity, contraceptive measure, duration on dialysis, dialysis frequency, erythropoietin dose, antihypertensive drugs and baseline biochemical data (hemoglobin, serum calcium and phosphorus levels within the 3 months prior to the diagnosis of pregnancy) at diagnosis of pregnancy. The pregnancy parameters recorded were gestational age at diagnosis, age at termination of pregnancy, and pregnancy outcome. Therefore, a successful pregnancy outcome was defined as a pregnancy resulting in the birth of a live infant.

For the successful pregnancy, additional information including dialysis frequency, erythropoietin dose, and antihypertensive drugs received during pregnancy was noted. Maternal and fetal complications as well as mode of delivery, fetal weight, and duration of hospital stay for both mother and infant were also recorded.

RESULTS

During the 11 years of the hemodialysis unit, 139 women were admitted for long-term hemodialysis of whom 84 (60.4%) were aged between 14-44 years at initiation of dialysis. None of the women was on contraception or had been counseled about pregnancy at the initiation of dialysis. We observed six pregnancies in 4 (4.8%) out of the 84 women, giving a cumulative incidence of 7.14% in 11 years. Two women became pregnant twice. The mean age of women who conceived was 30 ± 5.47 years (range: 21-35 years), mean dialysis vintage 39.5 ± 26.24 months (range: 10-74 months), and the mean gestational age at diagnosis of pregnancy was 15.8 ± 4.02 weeks (range: 12-23 weeks). Five of the pregnancies occurred in women with regular monthly menses while the other occurred in a woman with a thirteen months history of amenorrhea. Out of the 6 pregnancies, 4 (66.7%) were diagnosed during a spontaneous abortion, there was one (16.7%) elective abortion performed for socio-economic reasons and projected maternal complications, and one (16.7%) live preterm birth at 34 weeks through an emergency caesarian section. All cases of spontaneous abortion were complicated by severe hemorrhage requiring blood transfusion. Furthermore, the one woman with a successful pregnancy stayed in hospital throughout the pregnancy for intensive dialysis and frequent fetal monitoring since she resided four hours away from the hospital. Her care included daily conventional HD sessions of 4 hours 6 days per week, 10000IU of recombinant erythropoietin thrice weekly with

intravenous iron, phosphorus tablets and water soluble vitamins. Blood pressure control was ensured by nifedipine, alpha methyl dopa and labetalol. Fetal ultrasound and relevant laboratory tests were done fortnightly. She developed severe preeclampsia with fetal distress at 34 weeks of gestation which led to an

emergency caesarian section with the birth of a live baby weighing 1600kg. Apgar score 4 on 10 at birth. The baby required intensive neonatal care for 3 weeks after which he was discharged home without any neurological deficits. Patient and pregnancy data are summarized in Tables 1 and 2.

Table 1. Summary of patient and pregnancy-related data

PREGNANCY N°	1	2	3	4	5	6
Month/year of diagnosis	7/ 2011	2/ 2012	8/2012	10/2012	10/2012	6/2013
Patient No.	1	2	2	3	1	4
Maternal age at diagnosis of pregnancy	32	29	29½	21	33	35
Etiology of ESRD	Primary FSGS	Chronic GN	Chronic GN	Chronic GN	Primary FSGS	Malignant nephrosclerosis
Dialysis vintage (month)	59	16	24	54	74	10
Number of dialysis sessions/week	2	2	2	3	2	2
Residual diuresis (ml/day)	0	400	400	0	0	500
Gravidity	3	5	6	1	4	4
Gestational age at diagnosis of pregnancy (weeks)	16	16	12	12	19	23
Gestational age at termination of pregnancy (weeks.)	16	16	14	12	19	34
Outcome of pregnancy	SA	SA	EA	SA	SA	Live delivery 34 weeks

SA = spontaneous abortion, EA= Elective abortion

Table 2: clinical and laboratory data at diagnosis of pregnancy¹

PREGNANCY N°	1	2	3	4	5	6
Systolic BP(mmHg)	160	150	143	154	150	145
Diastolic BP(mmHg)	97	85	82	92	104	93
Hemoglobin level(g/dl)	9.5	9.2	8.8	8.5	8.9	9.8
Total serum calcium(mg/dl)	95	96	88	85	90	83
Serum phosphorus(mg/dl)	52	55	60	67	56	45
Erythropoietin/	yes	no	no	no	yes	No
IV iron use						

Mean values within 3 months of diagnosis of pregnancy.

DISCUSSION

Since the introduction of maintenance hemodialysis in Cameroon over two decades ago, and specifically 11 years in our center, this is the first report of pregnancy in women undergoing maintenance dialysis in the country. Six pregnancies occurred in four women during the period of observation giving a cumulative incidence of 7.14% in 11 years. Pregnancy was diagnosed late in all cases with spontaneous abortion being the mode of revelation in four of them. One out of the six pregnancies resulted in a successful premature delivery of a live infant at 34 weeks, and only the later woman accepted post pregnancy contraception. Our findings confirm the rarity and challenging course of pregnancy described

in dialysis-dependent women in both middle and high income countries [5,12,17,23]

Despite increasing reports of pregnancy in women undergoing maintenance hemodialysis worldwide, pregnancy in this population remains an unusual event which is associated with a high maternal and foetal morbidity[5]. The largest registry of pregnancy in dialysis patients showed 2% of patients on dialysis became pregnant over a 4 year period [6]. Conception rates of ranging from < 1% to 15.9% have been reported[24] The cumulative incidence of pregnancy of 7.14% recorded in the present study is therefore in consonance with other reports. Several factors may influence the frequency of pregnancies such as the proportion of sexually active women of child-bearing age in the facility, the rate of

contraception use, the quality of dialysis and consequently the quality of life. Better conception rates have been reported following more efficient dialysis and the use of recombinant erythropoietin [3,6,17]. The highest conception rates have been observed with nocturnal hemodialysis[17]. In the present study, we observed pregnancies in women undergoing 8 hours of conventional hemodialysis a week which is considered inadequate for anuric patients, and who had limited access to substitutive therapies for chronic kidney disease.

Pregnancy was unplanned, unexpected and consequently diagnosed late in all cases in this present study, with spontaneous abortions being the mode of revelation in over half of pregnancies. This observation is consistent with earlier reports in developed countries when preconception counseling was unusual [1,4,11]. Although most recent studies exclude abortions, their frequency appears to have declined in parallel with an increase in the number of planned pregnancies [17,24]. Abortion rates of less than 25% are currently observed in developed countries [5,23,24]. The absence of preconception counseling for dialysis-dependent women who are in the child-bearing age may account for the high rate of unplanned pregnancies and abortions seen in the present study. We do not routinely counsel young women on the possibility of conception at the initiation of dialysis due to the anticipated poor quality of life in these patients who receive suboptimal dialysis therapy.

Successful pregnancies are now frequent worldwide with live birth rates above 70% in recent reports [17,25]. Hypertension, preeclampsia, and prematurity are frequent morbidities encountered [5,12,13,24,25]. Multidisciplinary medical teams, intensive dialysis of more than 20 hours a week, increased erythropoietin doses and the availability of facilities for high risk pregnancy are often required to ensure a live delivery and maternal safety as illustrated in this study [13–15,26].

Contraception was refused after five [5] of the six pregnancies, explaining a second pregnancy in two of the women. Socio-cultural values which favor large families in our environment, may explain this attitude which has been reported in other regions with similar social representations [27–30].

This study is limited by its observational nature. The frequency of pregnancies may be higher than observed since early first semester abortions may go unnoticed in these population of women. Despite these limitations, this study provides useful

information for caregivers in facilities with similar hemodialysis practices.

CONCLUSION

Pregnancy is rare but possible in dialysis-dependent women receiving suboptimal hemodialysis care. The high frequency of complications observed in the present study, call for the inclusion of preconception counseling in the care package of young ESRD women in resource-limited settings.

REFERENCES

- [1] Successful pregnancies in women treated by dialysis and kidney transplantation. Report from the Registration Committee of the European Dialysis and Transplant Association. *Br J Obstet Gynaecol.* 1980 Oct;87(10):839–45.
- [2] Hou SH. Frequency and outcome of pregnancy in women on dialysis. *Am J Kidney Dis.* 1994;23(1):60–3.
- [3] Bagon J, Vernaev H, De Muylder X, Lafontaine J, Martens J, Van Roost G. Pregnancy and dialysis. *Am J Kidney Dis.* 1998 mai;31(5):756–65.
- [4] Toma H, Tanabe K, Tokumoto T, Kobayashi C, Yagisawa T. Pregnancy in women receiving renal dialysis or transplantation in Japan: a nationwide survey. *Nephrol Dial Transplant.* 1999 Jun 1;14(6):1511–6.
- [5] Nadeau-Fredette A-C, Hladunewich M, Hui D, Keunen J, Chan CT. End-Stage Renal Disease and Pregnancy. *Adv Chronic Kidney Dis.* 2013;20(3):246–52.
- [6] Holley JL, Schmidt RJ, Bender FH, Dumler F, Schiff M. Gynecologic and reproductive issues in women on dialysis. *Am J Kidney Dis.* 1997;29(5):685–90.
- [7] Lew SQ, Patel SS. Psychosocial and quality of life issues in women with end-stage renal disease. *Adv Chronic Kidney Dis.* 2007;14(4):358–63.
- [8] Palmer BF. Sexual dysfunction in uremia. *J Am Soc Nephrol.* 1999;10(6):1381–8.
- [9] Thompson S, Marnoch CA, Habib S, Robinson H, Pauly RP. A successful term pregnancy using in-center intensive quotidian hemodialysis. *Hemodial Int.* 2011;15(S1):S59–S63.
- [10] Haase M, Morgera S, Bamberg C, Halle H, Martini S, Hoher B, et al. A systematic approach to managing pregnant dialysis patients—the importance of an intensified haemodiafiltration protocol. *Nephrol Dial Transplant.* 2005 Nov 1;20(11):2537–42.
- [11] Shahir AK, Briggs N, Katsoulis J, Levidiotis V. An observational outcomes study from 1966–2008, examining pregnancy and neonatal outcomes from dialysed women using data from the ANZDATA Registry. *Nephrology.* 2013;18(4):276–84.

- [12] Hou S. Editorial Focus: Dialysis and Pregnancy: Pregnancy in Dialysis Patients: Where Do We Go From Here? *Semin Dial.* 2003;16(5):376–8.
- [13] Vázquez Rodríguez JG. Hemodialysis and pregnancy: technical aspects. *Cir Ciruj.* 2010;78(1):93–6.
- [14] Reddy SS, Holley JL. Management of the pregnant chronic dialysis patient. *Adv Chronic Kidney Dis.* 2007;14(2):146–55.
- [15] Hou S. Modification of dialysis regimens for pregnancy. *Int J Artif Organs.* 2002 Sep;25(9):823–6.
- [16] Bamberg C, Diekmann F, Haase M, Budde K, Hocher B, Halle H, et al. Pregnancy on Intensified Hemodialysis: Fetal Surveillance and Perinatal Outcome. *Fetal Diagn Ther.* 2007;22(4):289–93.
- [17] Barua M, Hladunewich M, Keunen J, Pierratos A, McFarlane P, Sood M, et al. Successful Pregnancies on Nocturnal Home Hemodialysis. *Clin J Am Soc Nephrol.* 2008 Mar 1;3(2):392–6.
- [18] Eroğlu D, Lembet A, Özdemir FN, Ergin T, Kazancı F, Kuşcu E, et al. Pregnancy during hemodialysis: perinatal outcome in our cases. *Transplant Proc.* 2004 Jan;36(1):53–5.
- [19] Naicker S. End-stage renal disease in Sub-Saharan Africa. *Kidney Int Suppl.* 2013 May;3(2):161–3.
- [20] Sambo LG, Kirigia JM, Ki-Zerbo G. Health financing in Africa: overview of a dialogue among high level policy makers. *BMC Proc.* 2011 Jun 13;5(Suppl 5):S2.
- [21] Swanepoel CR, Wearne N, Okpechi IG. Nephrology in Africa—not yet uhuru. *Nat Rev Nephrol.* 2013;9(10):610–22.
- [22] Raharivelina CA, Randriamanantsoa LN, Rabenantoandro R. Hémodialyse chronique et grossesse. *Médecine Afr Noire.* 51(1):27–30.
- [23] Jesudason S, Grace BS, McDonald SP. Pregnancy Outcomes According to Dialysis Commencing Before or After Conception in Women with ESRD. *Clin J Am Soc Nephrol CJASN.* 2013 Nov 14;
- [24] Hladunewich M, Hercz AE, Keunen J, Chan C, Pierratos A. Pregnancy in end stage renal disease. *Semin Dial.* 2011 Dec;24(6):634–9.
- [25] Luders C, Martins Castro MC, Titan SM, De Castro I, Elias RM, Abensur H, et al. Obstetric Outcome in Pregnant Women on Long-term Dialysis: A Case Series. *Am J Kidney Dis.* 2010 juillet;56(1):77–85.
- [26] Chao A-S, Huang J-Y, Lien R, Kung F-T, Chen P-J, Hsieh PCC. Pregnancy in women who undergo long-term hemodialysis. *Am J Obstet Gynecol.* 2002 Jul;187(1):152–6.
- [27] Piccoli GB, Conijn A, Consiglio V, Vasario E, Attini R, Deagostini MC, et al. Pregnancy in dialysis patients: is the evidence strong enough to lead us to change our counseling policy? *Clin J Am Soc Nephrol.* 2010;5(1):62–71.
- [28] Souqiyyeh MZ, Huraib SO, Saleh AG, Aswad S. Pregnancy in chronic hemodialysis patients in the Kingdom of Saudi Arabia. *Am J Kidney Dis Off J Natl Kidney Found.* 1992;19(3):235.
- [29] Bahloul H, Kammoun K, Kharrat M, Jarraya F, Charffedine K, Hamida MB, et al. Pregnancy in chronic hemodialysis women: outcome of multicentric study. *Saudi J Kidney Dis Transplant Off Publ Saudi Cent Organ Transplant Saudi Arab.* 2003 Dec;14(4):530–1.
- [30] Malik GH, Al-Wakeel JS, Shaikh JF, Al-Mohaya S, Dohami H, Kechrid M, et al. Three successive pregnancies in a patient on haemodialysis. *Nephrol Dial Transplant.* 1997;12(9):1991–3.
- [31]