Brief Report
Volume 12:9, 2022

Journal of Nephrology & Therapeutics

ISSN: 2161-0959 Open Access

Assessment of Cardiovascular Complications at Ziguinchor Haemodialysis Centre in the Southern Senegal

Ba Aw Mamadou[1]*, Kane Yaya[1], Manga Simon[2], Ba Diengz Ameth[3]

[1]Nephrology/Hemodialysis Department, Ziguinchor RHC, Assane Seck University-Ziguinchor, Senegal
[2]Cardiology Department, Hôpital la Paix de Ziguinchor, Assane Seck University-Ziguinchor, Senegal
[3]Nephrology/Hemodialysis department, Université de Thiès, Thies, Senegal

Abstract

Introduction: Cardiovascular complications are very lethal in chronic haemodialysis patients. They are the leading cause of mortality in this population, which is 3 to 20 times higher than in the general population of the same age group. Our work aimed to determine the frequency of cardiovascular complications in our patients.

Patients and methods: We conducted a two-month looking-forward study of descriptive and analytical purpose in the haemodialysis centre of Ziguinchor regional hospital. Data were collected through a questionnaire providing information on epidemiological, clinical and paraclinical parameters. All patients underwent an electrocardiogram and a trans-thoracic cardiac echocardiogram after the dialysis session.

Results: The mean age of the patients was 41.14 years and 57.14% of the patients were hypertensive. Exertional dyspnea was the main clinical manifestation in 47.61% and 28.57% of patients had electrical left ventricular hypertrophy. On echocardiography, concentric LVH was found in 47.61% of patients.

Conclusion: Chronic haemodialysis patients are at risk of common and lethal cardiovascular complications. The management requires a monitoring with periodic paraclinical examinations to prevent complications.

Keywords: Cardiovascular complications • Chronic haemodialysis patients • Ziguinchor

Introduction

Cardiovascular disease is the leading cause of death worldwide and accounts for 30% of total worldwide all-cause mortality [1]. They are even more lethal in chronic haemodialysis patients, to the extent that they are 3 to 20 times higher in these patients compared to the general population of the same age group [2,3]. The majorities of these complications occurs before the dialysis stage and are sometimes worsened by extra-renal purification sessions. However, the physiology of cardiovascular abnormalities in dialysis patients remains poorly understood [4]. Several factors are involved including altered lipid metabolism and the accumulation of uraemic toxins derived from the gut microbiota such as trimethylamine N-oxidase (TMAO), and affecting cardiovascular function in the context of renal failure have been described [4,5]. These complications are multiple and can affect the different heart walls.

It's against this backdrop that we conducted this study with the objectives of determining the frequency of these complications in our chronic hemodialysis patients and to search for associated factors for good prevention.

Patients and Methods

We conducted a prospective, descriptive and analytical study over a period of 2 months ranging from 15 February to 15 April 2020 in the haemodialysis centre of Ziguinchor regional hospital. Patients with more than 3 months of chronic haemodialysis, aged over 18 years, performing a continuous dialysis programme of at least 3.5 hours and 2 to 3 times a week were included in the study after free and informed consent. The data collection was done through a pre-filled form including information about identity (age, gender, initial kidney disease, duration of dialysis), some co-morbidities such as hypertension, diabetes, pre-existing heart disease, gout or any other medical history, some dialysis parameters (dry weight, inter-dialysis weight gain, pump flow rate, Kt/v indicating the quality of dialysis with a target set at 1.4), clinical signs of right ventricular failure (lower limb edema, turgidity of the jugular veins...) and/or left ventricular failure (dyspnea, cough, orthopnoea), biological data, in particular the haemoglobin level, the calcaemia, the phosphataemia.

Cardiac ultrasound and ECG were performed on the same day with a delay ranging from 3 hours to 8 hours after the dialysis session by a cardiologist followed by the interpretation of the results. Left ventricular hypertrophy was defined as a left ventricular mass indexed to body surface area greater than 131 g/m2 in men and 100 g/m2 in women. Pulmonary hypertension was defined as a systolic pulmonary artery pressure greater than 35 mm Hg [4].

Data were analysed using EPI-Info software and continuous variables were presented as mean ± standard deviation. P values less than 0.05 were considered as significant.

Results

Twenty-four patients were included in the study with a mean age of 41.14 ± 13.31 years. There were as many men as women, corresponding to a sex ratio of 1. The mean duration of dialysis was 32.14 ± 22.58 months. Fourteen patients (58.33%) had hypertension and 3 patients (12.5%) had diabetes. Benign nephroangiosclerosis was the main cause of chronic renal failure in 11 patients (45.83%), followed by diabetic nephropathy in 3 patients (12.5%) (Table 1). For the dialysis parameters, all patients underwent 12 hours per week divided into 3 sessions of 4 hours each, excepted one patient who had

***Address for Correspondence:** Ba Aw Mamadou, Nephrology/Hemodialysis Department, Ziguinchor RHC, Assane Seck University-Ziguinchor, Senegal, Tel: +221-77-180-44-45; E-mail: mmadouaw.ba19@gmail.com*

Date of Submission: 13 September, 2022, Manuscript No. JNT-22-74558; **Editor Assigned:** 15 September, 2022, PreQC No. P-74558; **Reviewed:** 19 September, 2022, QC No. Q-74558; **Revised:** 23 September, 2022, Manuscript No. R-74558; **Published:** 30 September, 2022, DOI: 10.37421/2161-0959.2022.12.411

2 sessions of 5 hours per week, standing for 10 hours. Fourteen patients (58.33%) had an arteriovenous fistula as a vascular approach, 8 patients (33.33%) had a tunnelled jugular catheter. The mean inter-dialytic weight gain was 1.89 ± 1.05 kg and the mean Kt/v was 1.48 ± 0.56. Physical signs were dominated by dyspoea and/or cough in 56% followed by lower limb oedema and/or hepato-jugular reflux in 20% (Table1). The mean haemoglobin level was 8.75 ± 2.05 g/dl and 17 patients (79.16%) had anemia. The mean blood calcium level was 89.05 ± 10.03 g/L.

Regarding the electrocardiogram, 8 patients (33.33%) had electrical left ventricular hypertrophy, 3 patients (12.5%) had diffuse micro-voltage, 3 patients (12.5) had regular sinus tachycardia. On TTU, 10 patients had concentric LVH (41.66%), 6 patients had kinetic disorders (25%), 5 patients (20.83%) had PAH and it was severe in 1 patient, moderate in 2 others and mild in 1 patient. Left ventricular filling pressures were high in 4 patients (16.66). Two patients (8.33%) had valve calcifications (Table 2). For the treatment, 15 patients (62.5%) were on antihypertensive drugs, and the combination of

Table 1. Distribution of the 24 patients according to the sociodemographic, clinic and biological data.

Sociodemographic, clinic and biological data	Proportions (%)	Means
Dialysis duration		32,14 ± 22,58 years
Initial nephropathy		
BNAS	45,83	
Undetermined Nephropathy	37,5	
Diabetic Nephropathy	12,5	
Evolution of a ATN to KRI	4,16	
Medical history and comorbidities		
HPB	58,33	
Diabetes	12,5	
Obesity	4,16	
Cardiopathies	8,3	
Dialysis parameters		
Length of stay in dialysis		60,32 ± 20,45 kg
Dry weight		0,52 ± 0,11 L/H
Ultrafiltration rate		305,52 ± 20,90 ml/min
Blood output		1,89 ± 1,05 kg
IDWG		1,48 ± 0,56
Kt/v		
Vascular approaches		
AVF	58,33	
Tunnelled catheter	33,33	
Simple catheter	8,33	
Clinical manifestations		
Dyspnea	56	
Orthopnea	4	
Lower limb edema	20	
SJVT	8	
Others	12	
Biology		
Hemoglobin levels		8,75 ± 2,05 mg/dl
Serum calcium levels		89,05 ± 10,03 mg/l
Serum albumin levels		36,68 ± 9,33 g/L
Serum phosphate levels		37,21 ± 11,22 mg/L

Table 2. Distribution of 24 patients according to electrocardiogram and heart-ultrasound data.

Data	Proportion(%)
Electrocardiogram	
Electric LVH	33,33
Repolarisation disorders	12,5
Micro-voltages	12,5
Heart doppler-ultrasound	
LHH	41,66
PAH	20,83
Hypocinesia of the heart walls	25
Valvular calcifications	8,33
Others	
Elevated LVWR	16,66
MI	4,16
LVEF impairment	16,66
Pericardic effusion	4,16

ACE inhibitor and calcium channel blocker was most commonly used in 11 patients (45.83%). Regarding the analytical results, a correlation between the occurrence of LVH and certain parameters studied was sought, and of these only arterial hypertension and anemia were significantly associated with the occurrence of LVH with p values of 0.02 and 0.01 respectively.

Discussion

The mean age of our patients was 41.14 ± 13.31 years, including as many men as women, whereas the studies had a much older population with a mean age of 52 years and 57 years respectively [6,7]. The young age of our patients compared to these studies can be explained by the lack of knowledge of renal disease in rural areas, and especially the important use of herbal medicine especially in this population in rural areas which can accelerate a pre-existing renal disease towards the dialysis stage.

10 patients had concentric LVH or 41.66%. Our results are similar to those of with a frequency of LVH of 54.6% and much lower than those of with 68.8%, 71.5% and with 87% [6,8-10]. Furthermore, these same studies found anemia and hypertension to be associated with LVH which is consistent with our results where hypertension and anemia besides their frequency (58.33% and 70.83% respectively) were associated with the occurrence of LVH with respective p-values of 0.02 and 0.018. Anemia is the most involved factor in the occurrence of LVH as it leads to an increase in cardiac output as a result of an increase in heart rate and systolic ejection volume, which creates conditions of chronic volume overload responsible for left ventricular dilatation and septal thickening on echocardiography [4].

Six patients (25%) had segmental or diffuse kinetic disturbances that may be related either to myocardial ischaemia, which is common in this population due to an fast atherosclerosis process, or to parietal kinetic abnormalities that may also be present outside of any ischaemic pathology, probably secondary to regional fibrosis-type structural changes, as demonstrated by quantitative tissue analysis. Pulmonary arterial hypertension (PAH) was found in 5 patients or 20.83%. Our results corroborate with those of 20.1% [11], and much lower than those reported by Moussavi SA, et al. (49.3%) [12] and Fabian F, et al. (58%) [13]. In the literature, several factors were significantly associated with the occurrence of PAH, notably anaemia, hypoalbimunaemia and hyperphosphataemia, but we found no factors associated with PAH, neither anemia (p=0.22), nor hypoalbimunaemia (p=0.35)

Two patients (8.33%) experienced valve calcifications which are similar to the studies where valve calcifications were found in 10.52% and 12% respectively. A correlation has been found between age, duration of hemodialysis and the presence of valve calcifications in the literature [14]. No correlation was found between valve calcifications in our patients and length of time on dialysis.

Conclusion

Cardiovascular complications are very common, very serious and very deadly in chronic haemodialysis patients. Their detection is necessary thanks to echocardiography on a regular basis to allow an adapted and early management.

References

1. L'OMS lève le voile sur les principales causes de mortalité et d'incapacité dans le monde: 2000-2019.
2. "The USRDS Dialysis Morbidity and Mortality Study: Wave 2. United States Renal Data System." *Am J Kidney Dis* 1 (1997): S67-S85.
3. Mailloux, Lionel U., Barbara Napolitano, Alessandro G. Bellucci and Melchiore Vernace, et al. "Renal vascular disease causing end-stage renal disease, incidence, clinical correlates, and outcomes: a 20-year clinical experience." *Am J Kidney Dis* 24 (1994): 622-629.
4. Shafi, Tariq, Neil R. Powe, Timothy W. Meyer and Seungyoung Hwang, et al. "Trimethylamine N-oxide and cardiovascular events in hemodialysis patients." *J Am Soc Nephrol* 28 (2017): 321-331.
5. Heianza, Yoriko, Wenjie Ma, JoAnn E. Manson and Kathryn M. Rexrode, et al. "Gut microbiota metabolites and risk of major adverse cardiovascular disease events and death: a systematic review and meta-analysis of prospective studies." *J Am Heart Assoc* 6 (2017): e004947.
6. Moustapha, Cissé Mouhamadou, Lemrabott Ahmed Tall, Faye Maria and Fall Khodia, et al. "Evaluation des complications cardiaques chez les hémodialysés chroniques de Dakar." *Pan Afr Med J* 23 (2016): 43.
7. Bouterfas, B. "Prevalence of cardiovascular complications in hemodialysis patients; a multicenter study." *Arch Cardiovasc Dis Suppl* 11 (2019): e348.
8. Jun-Ping Tian, Tao Wang, Hong Wang and Li-Tao Cheng, et al. "La prévalence de l'hypertrophie ventriculaire gauche chez les patients en hémodialyse chinoise est plus élevée que chez les patients en dialyse péritonéale." *Ren Fail* 30 (2008): 391-400.
9. Vigan, Jacques, Séraphin Ahoui, Dominique Hounsou and Aline Céline Kpèhouédo Goudoté, et al. "Hypertrophie ventriculaire gauche chez les hémodialysés chroniques du CNHU-HKM de Cotonou." *Nephrol Ther* 14 (2018): 29-34.
10. Al Adlouni, A., N. Bassit, W. Fadili and I. Laouad. "Evaluation des facteurs de risques cardiovasculaires chez nos hémodialysés chroniques selon les recommandations de la K/DOQI. Dialyse." *Nephrol Ther* 7 (2011): 301-343.
11. Dagli, Canan Eren, Hayriye Sayarlioglu, Ekrem Dogan and Gurkan Acar, et al. "Prevalence of and factors affecting pulmonary hypertension in hemodialysis patients." *Respir* 78 (2009): 411-415.
12. Mousavi SA, Mahdavi-Mazdeh M, Yahyazadeh H. "Hypertension pulmonaire et facteurs prédisposants chez les patients hémodialysés." *Iran J Kidney Dis* 2 (2008): 29-33.
13. Fabbian F, Cantelli S, Molino C and Pala M, et al. L'hypertension pulmonaire chez les patients en dialyse: une étude italienne transversale. *Int J Nephrol* (2011): 283-475.
14. Eba, A., MS Aghrabatt, SM Moustapha, and A. Nagi, et al. "Les complications cardiovasculaires chez les insuffisants rénaux chroniques dialysés." *Cardiologie Tropicale* 32 (2006): 19-23.

How to cite this article: Mamadou, Ba Aw, Kane Yaya, Manga Simon and Ba Diengz Ameth. "Assessment of Cardiovascular Complications at Ziguinchor Haemodialysis Centre in the Southern Senegal." J Nephrol Ther 12 (2022): 411.