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Full Length Research Paper

Lipid profile of hemodialysis patients at the University Teaching Hospital Sylvanus Olympio in Togo

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The objective of this study was to determine the atherosclerotic index with dyslipidemia hemodialysis patients at the CHU Sylvanus Olympio in TOGO. It is a descriptive cross-sectional study which was carried out from 7 April to 7 June 2011 in the hemodialysis unit of the internal medicine department of the University Hospital of Lome-SO. The study involved a population of chronic kidney disease (CKD) patients on dialysis for at least six months. Dyslipidemia was determined on serum lipid results of the various parameters obtained taking into account the biochemistry laboratory standards CHU-SO. Data were recorded on a survey form and analyzed by means of the software Epi Info version 3.5 and Excel 2007. It comprised sixty (60) chronic hemodialysis patients regularly followed up in the CHU-SO hemodialysis service. The target population consisted of 41 men and 19 women i.e., a sex - ratio of 2.15. The average age was 48.16 ± 13.63 years, ranging from 22 to 77 years. The age group 40 to 49 years was the most represented with 32.69% of cases (n = 20). Out of the sixty hemodialysis patients who participated in the study, 50 had at least one cardiovascular risk factor. Hypertension and diabetes mellitus were the most represented risk factors with rates of 75% and 23.3%. Patients had one cardiovascular risk factor (CVRF) in 64.98%, 2 CVRF in 13, 32%, 3 CVRF in 5.32% and no CVRF in 16.66%. The observed lipid disorders were represented by the total hypercholesterolemia (15%), the hypo HDLemia (26, 66%), the hyperLDLemia (12.40%), hypertriglyceridemia (46.66%). Twelve patients (20%) had mixed dyslipidemia. The index of atherogenic was above normal in 36.66% most represented with women (52.64%) than men (17.08%). Dyslipidemia, namely hypertriglyceridemia and hypo-HDL cholesterol are common and potentially atherogenic with hemodialysis patients at the CHU-SO. Concern for the prevention and treatment of any systematic dyslipidemia with CKD hemodialysis patients proves necessary.

Key words: Atherosclerotic index, CKD, hemodialysis, Togo.

INTRODUCTION

Chronic kidney disease (CKD) is a progressive and irreversible deterioration of renal function. This is a serious and debilitating disease the frequency of which is increasing as attests its average annual growth rate estimated at 8%, whereas the average annual growth rate of the world population is 1.3% (ANAES, 2002). It has many causes, dominated in our context by high blood pressure and diabetes mellitus. In fact during the last decade, the incidence of this disease has doubled due to the pandemic of these cardiovascular risk factors CVRF (Massy et al., 2005). CKD is an ongoing public health concern in developing countries because of an increase in its frequency on the one hand (ANAES, 2002) and on the other of its management involving a very considerable

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financial, social and human cost (Ramilitiana et al., 2010).

Mortality and morbidity in dialysis patients during the (CKD) are dominated by cardiovascular complications; in fact the incidence of cardiac death is 3 to 20 times higher in dialysis patients compared to the general population (Massy et al., 2005). This has been observed itn several countries. Thus in the United States, the statistics of the USRDS (United States Renal Data System) showed a mortality rate of 23.1% per year in dialysis patients, 52% of cardiovascular causes. In Canada, a cohort of 433 dialysis patients followed for an average duration of 41 months, 149 deaths occurred, with 58% of cardiovascular causes.

In Japan, the proportion of deaths from cardiovascular causes identified in 1996 in hemodialysis patients was 49.2%. In France, a prospective survey among all dialysis centers in Ile-de-France in 1998 identified 461 deaths, with 50.3% of cardiovascular causes (ECI, 2005).

In 2010, the report of the Monitoring of the hemodialysis Unit of the University Teaching Hospital UTH-SO, Lomé, Togo reported 25 deaths out of 70 patients followed regularly. Half of the cases of reported deaths were related to cardiovascular complications (CVC) i.e. myocardial infarction, stroke and pulmonary embolism (Sabi et al., 2011). The occurrence of CVC is closely associated with the early development of arteriosclerosis which is favored by many factors including changes in the lipid profile. Indeed CKD patients usually have triglyceride (TG), low density lipoprotein (LDL) high with lowered high-density lipoprotein values (HDL), very atherogenic association. These lipid disturbances are not corrected by maintenance dialysis (Lacour et al., 1993). Current recommendations for better quality of cares for patients with advanced CKD, recommend to systematically address all dyslipidemia to reduce the occurrence of cardiovascular events with these patients (Benchikhi et al. 2005). Thus, the objective of this work was to determine the atherosclerotic index in hemodialysis patients with dyslipidemia in the University Teaching Hospital Sylvanus Olympio (UTH SO).

METHODOLOGY

It is a cross-sectional descriptive study which was carried out from 7 April to 7 June 2011 in the hemodialysis unit of the internal medicine department of the UTH-SO, Lomé.

Our study involved a target population of chronic renal failure patients on dialysis for at least six months in the CHU-SO hemodialysis service. Any hemodialysis patient regularly monitored in the hemodialysis service, who has granted an informed consent, afebrile at the moment of sampling and with no episode of coronary syndrome with later ST gap of at least 12 months was included in our study. For the measurement of lipid parameters, blood sampling was performed in the morning using a dry tube, after 12 hours of fasting. Lipids and lipoproteins reading was performed with a CLIMA PLUS spectrophotometer at 505 nm. The atherogenic index was obtained through the ratio total cholesterol / HDL cholesterol, the normal value of which was lower than 4.5.

Data were collected using an index card that included demographic (age, sex.) clinical and biological (total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides and atherogenic index) parameters. Our data were processed and analyzed on software Epi Info version 3.5 and Excel 2007. Quantitative variables were described using the average, standard deviation and extremes. Qualitative variables were described using proportions and percentages.

Dyslipidemia is determined on lipid serum results of the various parameters obtained taking into account the biochemistry laboratory standards of UTH-SO the reference values of which were: total cholesterol (Male: 0.90 - 2.00 g / L, Female: 1.30 - 2.00 g / L); HDL cholesterol (Male: from 0.30 to 0.56 g / L, Female: 0.43 to 0.61 g / L); LDL cholesterol (≤ 1.50 g / l); Triglyceride: 0,35 - 1,60g / l. All dialysis patients were included in the study after obtaining an informed consent.

RESULTS

Demographic Data

A total of 60 chronic hemodialysis patients regularly followed in the CHU-SO hemodialysis service were included. The average age of the study population was 48.16 ± 13.63 years, ranging from 22 to 77 years. The age group 40 to 49 years was the most represented with 32.69% of cases (n = 20). Our study population consisted of 41 men and 19 women i.e. a sex - ratio of 2.15.

Cardiovascular Risk Factors (CVRF)

Out of the sixty hemodialysis patients who participated in the study, 50 had at least one cardiovascular risk factor. High blood pressure (HBP) was the most frequent risk factor in our study population with 75%, followed by 23.3% of diabetes; obesity and smoking were observed with the same proportions of 33% and the menopause of 1,6%. Hypertension was associated with diabetes mellitus (DM) in 7 cases and obesity in 1 case; DS and hypertension were associated with obesity in 1 case, and smoking in 2 cases.

Patients had one cardiovascular risk factor (CVRF) in 64.98% (n = 39), 2 CVRF in 13, 32%, 3 CVRF in 5.32% and no CVRF in 16.66%.

Lipid Parameters

Lipid disorders (total cholesterol, hypoHDLemia, hyperLDLemia, hypertriglyceridemia) observed are Presented in Tables 1, 2, 3.

Table 1. Global distribution of dyslipidemia.

Type of abnormality	*Number (%)*	Average
Hypercholesterolemia	*9(15,00%)*	2 ,58 ± 0,58
Hypo-HDL cholesterol	*13(21,66 %)*	0,26 ± 0,0086
Hyper-LDL cholesterol	*8(12,4%)*	1,75 ± 0,27
hypertriglyceridemia	*28(46,66%)*	1,27 ± 0,54
High atherogenic index	*22(36,66%)*	6,64 ± 1,77

Table 2. distribution of dyslipidemia with men

Type of abnormality	Number *(%)*	Average
Hypercholesterolemia	6 *(14,64%)*	2,36± 0,48
Hypo HDL-cholestérolemia	6 *(14,64%)*	0,25 ± 0,0062
Hyper LDL-cholesterolemia	*4 (9,76%)*	1,61 ± 0,089
Hypertriglyceridemia	19 *(46,35%)*	1,20 ± 0,49
High atherogenic index	*7 (17,08%)*	7,82 ± 1,98

Twelve patients had mixed dyslipidemia i.e. 20% of the population. This dyslipidemia consisted of a total cholesterol and hyper LDL-cholesterol in 10% of cases; of hypertriglyceridemia and hyper-LDL cholesterol in 5% of cases; hypertriglyceridemia and hypo-HDL cholesterol in 1.66% of cases; of hypercholesterolemia, hypo-HDL cholesterol and a hyper LDL cholesterol in 3.33% of cases.

Table 3. distribution of dyslipidemia with women

Type of abnormality	Number *(%)*	Average
Hypercholesterolemia	3 *(15,79%)*	2,81± 0,68
Hypo HDL-cholestérolemia	7 *(36,85%)*	0,28 ± 0,11
Hyper LDL-cholesterolemia	3 *(15,79%)*	2,02 ± 0,28
Hypertriglyceridemia	8 *(42,10%)*	1,48 ± 0.54
High atherogenic index	*10 (52,64%)*	5,96 ± 1,20

DISCUSSION

A generalization bias is to be mentioned, indeed it is a hospital study and the results cannot be generalized to the general population. The age group from 40 to 49 years was the most affected by the CKD in our series (32.69%), the prevalence of CKD in young adult subjects in Africa is shared by other authors such as Youmbissi in Cameroon and Maoujoud in Morocco (Youmbissi et al., 1994; Maoujoud et al., 2011). Conversely, in Europe, it is the prerogative of the elderly, in fact in France more than 50% of subjects with CKD are more than 60 years old (Jacquelinet et al., 2005).

This epidemiological characteristics contrast is explained by the high prevalence of infectious diseases and the delay in screening and control of cardiovascular risk factors in Africa. Also, the highest life expectancy in Europe could also be an argument explaining the high prevalence of CKD with the elderly.

Hypercholesterolemia with Elevated Total Cholesterol

Hypercholesterolemia through increase in the total cholesterol levels is higher than 2.00 g / L was observed in 9 individuals (15%) including 6 male (14.64%) and 3 females (15.79%). The average age of these patients was 51.4 years for men and 46 years for women including 6 men (14.64%) and 3 women (15.79 %). Elsewhere, in Cameroon Youmbissi reported a level of total cholesterol higher than ours in CKD with dialysis patients (Youmbissi et al., 1994), this level was also higher in the series of Kaba in Guinea-Conakry in CKD with non-dialysis patients (Kaba et al., 2007). A good deal of controversies still exist regarding the optimal level of degradation in glomerular filtration rate at which lipid abnormalities occur, as well as the degree of evidence regarding the responsibility of dyslipidemia as an independent risk factor in CKD (Grimaldi, 2004).

Hypo-HDLcholesterol

Also known as atherogenic risk factor, 21.66% of dialysis patients had low HDL-cholesterol in our series, equally distributed between the sexes. This hypo-HDL cholesterol levels with CKD patients on dialysis is agreed upon by several African and Western authors (Youmbissi et al., 1994; Jamoussi et al., 2005; Pagniez, 2000) and would be due to a decrease in the activity of LCAT (lecithin-cholesterol acyltransferase) responsible for the decrease in the esterification of free cholesterol in HDL cholesterol, decreased HDL-cholesterol components (apolipoprotein Al, and A III), and an increase in the activity of CETP (cholesterol ester transfer protein) having implied an increase in HDL esterified cholesterol transfer to LDL (Grimaldi,2004).

Hyper LDL Cholesterolemia or Pure Hypercholesterolaemia

Pure cholesterolsterolaemia was found in 9.76% of men and 15.79% women. Also reported by Youmbissi in Cameroon

(Youmbissi et al. 1994), this increase in LDL-cholesterol levels with dialysis patients during the CKD could be explained by the protein loss in the sieving process, an increased synthesis of VLDL by the liver in response to glucose uptake, a decrease in the activity of triglyceride lipase and lipoprotein lipase and the loss of carnitine (David Fitchett, 2011).

Hypertriglyceridemia

The hypertriglyceridemia was found in 27 dialysis patients i.e. 19 men and 8 women. Reported by many African and Western authors (Ramilitiana et al., 2010; Youmbissi et al., 1994; Jamoussi et al., 2005; Pagniez, 2000), it is found in a minor proportion with patients, dialysed or not. However, in our study we observed in periodic dialysis hypertriglyceridemia states during the first two months in patients who did not present them before dialysis episodes. During peritoneal dialysis, this can be explained by hypertriglyceridemia carbohydrate intake responsible for the increase in hepatic production of VLDL (Grimaldi, 2004**).** The preventive or curative treatment of dyslipidemia in patients with terminal CKD patients dialysed or not, is required.

Dyslipidemia and Atherogenic Risk with Dialysis Patients During the Terminal CKD

The lipid disturbances were variously distributed, i.e. 15% of total cholesterol, 21.66% of hypo-HDL cholesterol, 12.4% of hyper LDL cholesterol and 46.66% of hypertriglyceridemia. Although these lipid disturbances are also found in the general population but to a lesser degree, the role of the CKD in the occurrence of deleterious dyslipidemic metabolic disorders for kidney and blood vessels is acknowledged by several authors (Youmbissi et al., 1994; AFSSPS, 2005; Jamoussi et al., 2005). Indeed CKD will alter the metabolism of plasma lipoproteins (caused by changes in renal hormones) and lipid abnormalities that result from it are potentially atherogenic and do not seem to be corrected by periodic dialysis (Jamoussi et al., 2005). Then, hemodialysis patients are people with a high cardiovascular risk.

As a result, the association of this dyslipidemia with other cardiovascular risk factors is said to increase the cardiovascular mortality (Ramilitiana et al., 2010). In our series dyslipidemia is associated with at least another cardiovascular risk factors in more than 60%. Prevention of renal failure through both early diagnosis and treatment and regular monitoring of modifiable risk factors for kidney disease including high blood pressure, diabetes and dyslipidemia prove necessary. The atherogenic index was high (36.66%) in dialysis patients, dyslipidemia seen in our hemodialysis patients is therefore not only a cardiovascular risk factor, but also a 17.08% of the men had high atherosclerotic index with a David Fitchett (2011). Nouveau regard sur la prise en self-aggravating factor for chronic kidney failure. A total of potential risk of acute coronary syndrome associated with an extra ST displacement, the atherosclerotic index was 52.64% in women.

CONCLUSION

Chronic kidney disease (CKD) is an illness which does not affect only the elderly in our context, high blood pressure is the most represented risk factor and is a self-aggravating factor of CKD. The lipid disturbances observed with hemodialysis patients are dominated by hypertriglyceridemia and hypo-HDL cholesterol with a high atherogenic index. These values are higher than those obtained in the general population; but lower than those of the non-dialyzed population. CKD causes a potentially atherogenic dyslipidemia and does not seem to be corrected by periodic dialysis. Hemodialysis patients are people with a high cardiovascular risk. It is therefore essential to make the prevention of kidney disease by means of both early diagnosis and treatment and regular follow up of modifiable risk factors for kidney disease including high blood pressure diabetes mellitus and dyslipidemia but also the prevention and systematic treatment of any dyslipidemia with CKD patients on dialysis.

CONFLICTS OF INTERESTS

Authors Report no Conflict of Interest

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