Cardiology and Cardiovascular Research
2021; 5(4): 225-229
http://www.sciencepublishinggroup.com/j/ccr
doi: 10.11648/j.ccr.20210504.21
ISSN: 2578-8906 (Print); ISSN: 2578-8914 (Online)

Global Cardiovscular Risk and Vascular Age in Patients with Ischemic Cardiopatia at the Kara University Hospital (Kara-U H)

Machihude Pio[1, *], Tchaa Tcherou[1], Doguénsaga Borgotia Atta[1], Lihanimpo Djalogue[1], Abalo Mario Bakai[1], Bénédicte Souho[1], Yaovi Mignazonzon Afassinou[2], Soulemane Pessinaba[2], Wiyaou Dieu-Donné Kaziga[2]

[1]Teaching and Research Unit in Cardiology and Vascular Diseases, University of Kara, Kara, Togo

[2]Teaching and Research Unit in Cardiology and Vascular Diseases, University of Lomé, Lomé, Togo

Email address:

pimae2002@yahoo.fr (M. Pio)

[*]Corresponding author

To cite this article:

Machihude Pio, Tchaa Tcherou, Doguénsaga Borgotia Atta, Lihanimpo Djalogue, Abalo Mario Bakai, Bénédicte Souho, Yaovi Mignazonzon Afassinou, Soulemane Pessinaba, Wiyaou Dieu-Donné Kaziga. Global Cardiovscular Risk and Vascular Age in Patients with Ischemic Cardiopatia at the Kara University Hospital (Kara-U H). *Cardiology and Cardiovascular Research.* Vol. 5, No. 4, 2021, pp. 225-229 . doi: 10.11648/j.ccr.20210504.21

Received: November 17, 2021; **Accepted**: December 16, 2021; **Published**: December 29, 2021

Abstract: Introduction: Ischemic heart disease, which used to be infrequent in African countries, has become a leading cause of cardiovascular morbidity. Objectives: To determine the frequency of cardiovascular risk factors, to calculate the level of cardiovascular risk in patients with ischemic heart disease, and to compare the calendar age and vascular age of these patients. Patients and methods: This is a descriptive and analytical study conducted from July 2017 to May 2021 in the cardiology department of Kara University Hospital and included records of patients hospitalized for ischemic heart disease. The different cardiovascular risk factors were analyzed allowing to determine the vascular age and the global cardiovascular risk of these patients before their stroke. Results: The hospital incidence of ischemic heart disease was 3.2%. There was a discrete female predominance (men/women=45/51). High blood pressure (65.6%) was the most associated risk factor, followed by metabolic syndrome (42.7%), dyslipidemia (36.5%) and diabetes (28.1%). The mean vascular age was 69.2±13.1 years compared with 59.8±12.3 years of vital age, corresponding to a difference of 9.4 years. This mean difference was higher in the younger age group under 60 years (13.1 years) and in women (11.1 years). Before their stroke, the overall high cardiovascular risk (≥20%) of having a cardiovascular event at 10 years in these patients was 26.1% for the WHO abacus versus 53.1% for the Framingham score. Conclusion: The overall high cardiovascular risk of patients with ischemic heart disease was very high before their stroke. Similarly, the difference between the vascular age and the vital statistics age is significant, reflecting the early arterial aging of these patients.

Keywords: Ischemic Heart Disease, Vascular Age, Cardiovascular Risk

1. Introduction

Ischemic heart diseases are cardiac pathologies caused by the myocardial ischemia. Since the year 2000, they have been the leading cause of death worldwide and in 2019 they were responsible for 16% of all deaths recorded worldwide [1-3]. Previously considered to be uncommon in Africa with a frequency of around 3% [4, 5] before the year 2000, the frequency of these pathologies has increased considerably to approach 25% nowadays [6].

The occurrence of ischemic heart disease or cardiovascular events can be predicted by assessing the cardiovascular risk, which corresponds to the probability of occurrence of a cardiovascular event in a given individual. Several tools are used to estimate this risk, including the WHO cardiovascular risk prediction chart [7] and the Framingham USA 2008 score [8]. The calculation of vascular age involves major cardiovascular risk factors namely high blood pressure, diabetes, dyslipidemia and smoking; which factors represent

the basis atheromatous disease and therefore ischemic heart disease [9]. The concept of vascular age was developed by D'Agostino et al. in the United States in the city of Framingham [8]. Since then, the determination of the vascular age has become essential for a better management of patients with ischemic heart disease. It is in this context that we undertook this work, which had the following objectives:

Determine the frequency of the different cardiovascular risk factors;

Compare the age of the civil status and the vascular age;

Calculate the level of cardiovascular risk in patients with ischemic heart disease followed in the cardiology department of the University Hospital Center (CHU) of Kara.

2. Method

2.1. Setting, Type and Period of Study

Our study was carried out in the cardiology department of the Kara University Hospital (CHU Kara), which is the reference center in the northern part of Togo. It is a descriptive and analytical study covering the period from July 2017 to May 2021, that is, a duration of forty-seven (47) months.

2.2. Study Population

Inclusion criteria

In our study, we included all records of patients of both sexes admitted as outpatients or inpatients and in whom the diagnosis of ischemic heart disease was made. To be valid, the patient's record must include responses to all parameters of the D'Agostino chart [marital status age, sex, diabetes, smoking, systolic blood pressure (SBP), total cholesterol and HDL cholesterol levels], weight, height, waist circumference, ECG, and final diagnosis.

Non inclusion Criteria

All incomplete records were not included in our study

Study protocol and definitions

Data were collected through the selected files and a predefined survey form was used to record the different parameters that were studied (age, sex, weight, height, BMI, blood pressure, cardiovascular risk factors, lipid profile [total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides]).

The diagnosis of ischemic heart disease was made on the basis of clinical (angina-like chest pain), electrocardiographic (subepicardial and subendocardial ischemia, subepicardial and subendocardial injury, myocardial necrosis), biological (elevation of troponin I), and echocardiographic (abnormal segmental kinetics) evidence.

The calculation of the vascular age of the patients was done using the chart developed by D'Agostino et al [8]. With seven parameters (age, sex, SBP, total cholesterol, HDL cholesterol, smoking, and the existence or not of diabetes). Each parameter is weighted and the total of the points obtained corresponds to the vascular age.

Cardiovascular risk was also obtained from the WHO AFR D cardiovascular risk assessment table.

The definition of metabolic syndrome was based on the National Cholesterol Education Program Adult Treatment Panel III (NCEP-ATP III) criteria [10]. It defines metabolic syndrome by the combination of at least three of these five criteria: abdominal obesity with a waist circumference greater than 102 cm in men and 88 cm in women, hypertriglyceridemia (≥1.5 g/L), low HDL Cholesterol (<0.4 g/L in men and<0.5 g/L in women), fasting plasma glucose greater than 1.1 g/L, and blood pressure greater than or equal to 130/85 mm Hg.

The Body Mass Index (BMI) classification used was that of the World Health Organization (WHO) [11]: underweight (BMI<18.5 Kg/m²), normal weight (BMI between 18.5 and 24.9 Kg/m²), pre-obesity (BMI between 25 and 29.9 Kg/m²), obesity class I (BMI between 30 and 34.9 Kg/m²), obesity class II or severe (BMI between 35 and 39.9 Kg/m²) and obesity class III or massive (BMI≥40 Kg/m²).

The biological definition of dyslipidemia was [12]:

Pure hypercholesterolemia: LDL cholesterol level>1.9 g/L

Pure hypertriglyceridemia: triglyceride level≥1.5 g/L,

Mixed dyslipidemia: high LDL cholesterol and triglycerides

Low HDL Cholesterol (<0.4 g/L in men and 0.5 g/L in women) associated or not with any of these three categories mentioned above.

2.3. Statistical Analysis

The data collected were processed by computer method using Epi Info Version 6.04d software with statistical tests (Chi² test). The significance threshold of $p<0.05$ was retained. Graphs were made by the graphing function of Microsoft Windows Excel 2013. Univariate and multivariate logistic regression was performed. The multivariate analysis was used to estimate the Odds ratios and their 95% confidence intervals for each variable.

2.4. Ethical Considerations

Each survey form had a unique number identifying the patient in order to preserve anonymity.

3. Results

3.1. General Characteristics and Cardiovascular Risk Factors

During the study period, 4953 patients were admitted to the cardiology department of the Kara University Hospital. Of the 4953 records, 159 patients had ischemic heart disease, that's, a hospital prevalence of 3.2%. After elimination of incomplete records, the study sample was composed of 96 records that met the inclusion criteria.

Of the 96 records of patients with ischemic cardiopatia, 51 patients were women, for a male-to-female sex ratio of 0.88. The mean age of the patients was 59.8±12.3 years with extremes of 30 and 98 years. Hypertension was the most associated risk factor in 65.6% of cases (63 patients). Table 1 summarizes the general characteristics and associated cardiovascular risk factors.

Table 1. *General characteristics and cardiovascular risk factors.*

Parameters	N (%) or N (m±SD)
Age	
< 60 years	52 (51,2±7,1)
≥ 60 years	44 (70±8,8)
Cardiovascular risk factors	
Overweight	30 (31,3%)
Obesity	21 (21,9%)
Diabetes	27 (28,1%)
H B	53 (65,6%)
Smoking	1
Low HDL cholesterol20	2O (21,1%)
Total hypercholesterolemia	31 (32,3%)
Hypertriglyceridemia	27 (28,1%)
Dyslipidemia	35 (36,5%)
Metabolic syndrome	41 (42,7%)

N=number, %=percentage, m±SD=mean plus or minus standard deviation

3.2. Vascular Age

The mean vascular age for the entire sample was 69.2±13.1 years. For patients younger than 60 years, the mean vascular age was 64.3±14.6 years, compared with a mean real age of 51.2±7.1 years. For patients aged 60 years or more, the mean vascular age was 75±7.9 years, compared with a mean real age of 70±8.8 years. The mean difference between vascular age and real age was estimated to be 9.4 years for all patients. Figure 1 compares the real and vascular age of patients for each age group.

The mean difference between vascular age and real age in women was estimated at 17.6 years in those under 60 years of age versus 3.1 years in those 60 years of age and older. For all patients, this difference was estimated at 11.1 years (figure 2).

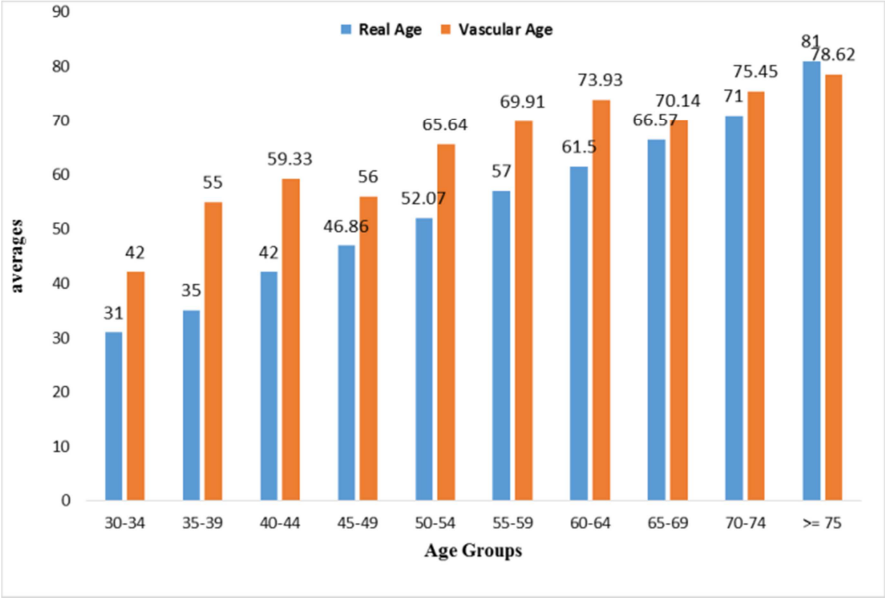

Figure 1. *Comparison of mean real age and mean vascular age.*

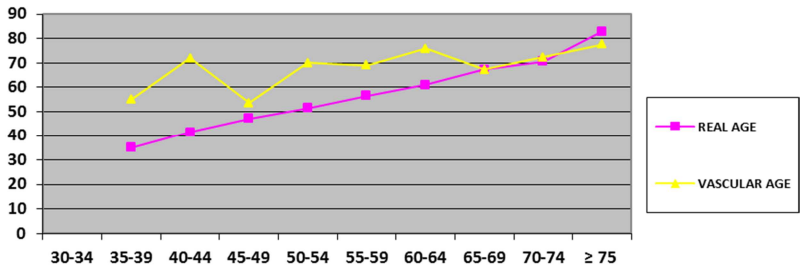

Figure 2. *Comparison between mean real age and mean vascular age in women.*

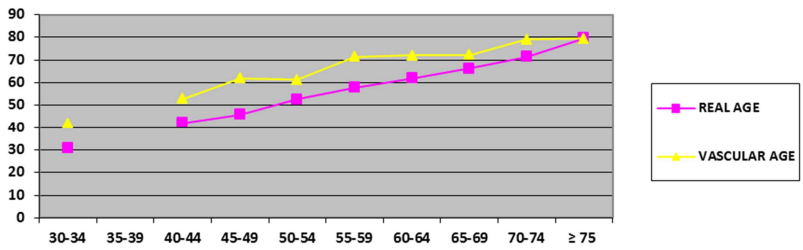

Figure 3. *Comparison of mean real age and mean vascular age in men.*

The mean difference between vascular age and real age in men was estimated at 12.3 years in those under 60 years of age and 5.8 years in those 60 years of age and older. The mean difference for all men was 9.43 years (figure 3).

3.3. Cardiovascular Risk

Using the WHO abacus the number of patients at high risk (≥20%) of having a cardiovascular event was (26.1%). This risk was 53.1% with the Framingham score (Table 2).

Table 2. *Distribution of patients according to cardiovascular risk by method used (WHO or Framingham).*

	Number	Percentage
WHO Chart		
Low risk (<10%)	53	55,2%
Moderate Risk (10%-20%)	18	18,8%
High Risk (20%-30%)	12	12,5%
Very High Risk (30%-40%)	13	13,6%
Total	96	100%
Framingham Score		
Low and Moderate risk (<20%)	45	46,9%
High Risk (≥20%)	51	53,1%
Total	96	100%

4. Discussion

The hospital incidence of ischemic heart disease in our study was 3.2%. This rate is significantly lower than the current frequencies of ischemic heart disease in African populations [6]; even lower than the rates in industrialized countries where ischemic heart disease ranks first in terms of morbidity and mortality [3, 13, 14]. This low prevalence rate in our study would be due to sampling or under-diagnosis of the disease because of limited diagnostic means (absence of myocardial scintigraphy, coroscanner, coronary angiography).

Our study shows a slight predominance of women (sex ratio=0.88) with an average age of 59.8%. This female predominance has also been observed by some authors [15, 16] in patients with ischemic heart disease because of the numerous atheromatous risk factors (obesity, sedentary lifestyle, dyslipidemia) that they accumulate. Regarding the age of patients, almost all studies in African countries find an average age below 60 years. Diarra et al in Mali [17], Kimbally-kaki et al in Congo [4] found an average age of 57 and 58 years respectively. On the other hand, these patients are older in industrialized countries such as France where the average age is always over 60 years [18]. The young age of patients in African and other developing countries is explained by the low socioeconomic level of patients, which makes it difficult to properly manage the atheromatous risk factors (hypertension, diabetes, dyslipidemia) that constitute the basis of this disease.

In our study, arterial hypertension is the most frequent risk factor found in 65.6% of cases. Several studies in Africa are unanimous on the primary role of hypertension in the genesis of ischemic heart disease [4, 19, 20]. This is a particularity of the black race in relation to coronary syndromes. This first place of hypertension can be explained by its high prevalence in the black race, its characteristics (immediately severe and early complicated) in young black subjects.

4.1. Vascular Age

Calculating the vascular age of a patient allows us to determine the degree of aging of the arteries. This phenomenon of aging, also called arteriosclerosis, is also influenced by the various atheromatous risk factors such as hypertension, diabetes, smoking, dyslipidemia and others. The presence of these risk factors in a patient explains the early aging of his arteries. The mean vascular age of the patients in our study was 69.2 years compared with a real mean age of 59.8 years, which corresponds to a mean difference of 9.4 years. Considering gender, the mean difference between vascular age and actual age was higher in women (11.1 years) than in men (9.4 years). This finding is explained by the fact that apart from the major risk factors shared by both sexes, women more often accumulate other factors such as sedentary lifestyle, obesity, and dyslipidemia.

Considering the age of the patients, the mean difference between vascular age and actual age is greater in the youngest patients (13.1 years in those younger than 60 years versus 4.5 years in those of 60 years and older). This clearly elucidates the young age of patients who develop cardiovascular disease in Africa and developing countries [19, 20]. It is then necessary to effectively manage atheromatous risk factors to bring the vascular age of patients closer to their actual age, especially in younger patients.

These different results allow us to understand that subjects with ischemic heart disease who appeared young were in fact older. The calculation of vascular age is simple and easily reproducible. It should serve as a practical working tool for the physician on the one hand, and as an element of awareness for the patients on the other. The physician's role will be to give advice and to convince his patient of the need to bring the vascular age closer to his real age. Like a scale for weight measurement, the D'Agostino chart will be a tool for the patient to periodically assess his or her vascular age and cardiovascular risk. Bringing the vascular age closer to the age of the civil status means fighting against cardiovascular risk factors.

4.2. Cardiovascular Risk

Assessment of cardiovascular risk, which is the probability of occurrence of a cardiovascular event during a given period, makes it possible to detect high-risk patients so as to take preventive measures to avoid these events. Using the WHO abacus, the high and very high risk was twice as low (26.1%) as using the Framingham abacus (53.1%). The determination of cardiovascular risk has been assessed differently by authors because of the different techniques used, the difference in study populations, and also the prevalence of factors involved in determining risk. For example, Houenassi et al [21] found 60% high risk in hypertensive patients in Cotonou, Benin. Lower rates of high cardiovascular risk have been found in the literature: Munyapara S. A. et al [22] in the Democratic

Republic of Congo and Bruckert E. et al [23] in France found respectively 34.2% and 20%.

It is therefore necessary to periodically assess the risk of patients and fight against the risk factors in the framework of primary prevention. According to Simon et al [24], the primary objective of prevention is to detect a high cardiovascular risk in a patient without symptoms and/or clinical cardiovascular disease. Thus, the modalities of this prevention must be adapted to the patient's risk profile. Education on hygienic and dietary measures, screening, and correct and early management of the various risk factors would reduce these risk levels.

5. Conclusion

In Togo, ischemic heart disease affects a relatively young population with a relatively low hospital frequency of 3,2%. High blood pressure is the most frequent risk factor (65,6%). The vascular age was higher than the real age of the patients with a considerable mean age difference of 9,4 years. This mean difference is higher in younger subjects and in women. The high cardiovascular risk is lower with the WHO chart (26,1%) compared to that of the Framingham chart (53,1%).

References

[1] Mendis S, Puska P, Norrving B. Global Atlas on Cardiovascular Disease Prevention and Control. 1-155. Genève (CH): Organisation mondiale de la santé; 2011.

[2] Montalescot G, Sechtem U, Achenbach S, et al. 2013 ESC guidelines on the management of stable coronary artery disease: the Task Force on the management of stable coronary artery disease of the European Society of Cardiology. Eur Heart J 2013; 34: 2949-3003.

[3] Michelle DEKER. Avancées dans l'ischémie myocardique et l'insuffisance cardiaque-Focus sur le patient diabétique, Neuilly. Cardiol pratique. 2020.

[4] Kimbally-Kaky G, Bouramoue C. Profil et avenir des patients Congolais atteints d'insuffisance coronarienne à propos de 743 cas. Médecine d'Afrique noire; 2000 (47): 197-203.

[5] Ticolat P, Bertrand E, Barabe P. Aspects épidémiologiques de la maladie coronaire chez le noir africain: à propos de 103 cas. Résultats de l'enquête multicentrique CORONAFRIC. Cardiol Trop. 1991; 17: 7-20.

[6] Ba A. Epidémiologie de la coronaropathie en Afrique. Congrès APPAC, nov. 2017. Biarritz. https://www.google.com/search?Epidémiologie-de-la-coronaropathie-en-Afrique/.

[7] World Health Organization (WHO). Prevention of Cardiovascular Disease, Pocket Guidelines for Assessement and Management of Cardiovascular Risk; Geneva 2007.

[8] D'Agostino B, Ramachandran S, Michael J, Philip A, Mark C, Joseph M, William B. General Cardiovascular Risk Profile for Use in Primary Care: the Framingham Heart Study. Circulation. 2008; 117: 743-753.

[9] Berriche O, Romdhane W, Arfa S et al. Cardiopathie ischémique chez les patients diabétiques: à propos d'une série de 100 diabétiques. Annales d'Endocrinologie. 2021, 82 (5): p 508.

[10] ATP III Guidelines At-A-Glance Quick Desk Reference; National Cholesterol Education Program. US Departement of Health and Human Services. NIH Publication N° 01-3304, may 2001.

[11] World Health Organization (WHO). BMI Classification 2004. http://www.who.int/bmi/index.jsp?intro Page=intro_3.html.

[12] David A, Lellouche N. KB Cardiologie: Cardiologie vasculaire. 8e éd. Paris: VG; 2018, 734p. 10, 24-25, 88-91, 113-158.

[13] Ferrières J, Cambou JP. Épidémiologie du syndrome coronaire aigu en France. Annales de Cardiologie et d'Angéiologie. 2007; 56 (1): 8-15.

[14] Roth GA, Johnson C, Abajobir A, et al. Global, Regional, and National Burden of Cardiovascular Diseases for 10 Causes, 1990 to 2015. J Am Coll Cardiol 2017; 70: 1-25.

[15] Damorou F, Yayehd K, Pessinaba S, Baragou R, Soussou B. Les cardiopathies ischémiques (CI) à Lomé: aspects épidémiologiques et facteurs de risques (étude de 461 cas). Mali Méd. 2008, 23 (3), 47-54.

[16] Hdidou Y, Aynaou H, Latrech H. La cardiopathie ischémique chez les diabétiques de type 2: à propos de 51 patients (Oujda, Maroc). Diabetes and Metabolism. 2014; 40: 38-39.

[17] Diarra M. B, Diarra A, Sanogo K, Diakité S, Tchintchui N, Diall I, Diallo B. A, Toure M. K. Cardiopathies ischémiques en Cardiologie à Bamako (à propos de 162 cas). Mali Méd; 2007. 22 (4): 36-39.

[18] Barthelemy O, Jacqueminet S, Rouzet F. Intensive cardiovascular risk factors therapy and prevalence of silent myocardial ischaemia in patients with type 2 diabetes. Arch cardiovasc Dis. 2008; 101 (9): 539-46.

[19] Thiam M, Cloatre G, Fall F, Thébald X, Perret J. Cardiopathies ischémiques en Afrique, expérience de l'Hôpital Principal de Dakar. MAN; 2000, 47: 282-284.

[20] Samadoulougou A, Lengani A, Zabsonre P, Kabore J. P, Toguyeni B, Nebie L, Niakara A, Sanou B, Tega Y. Aspects épidémiologiques, cliniques et évolutifs des cardiopathies ischémiques dans le service de cardiologie du centre hospitalier universitaire Yalgado Ouedraogo à Ouagadougou. MAN. 2011; 58 (1): 14-18.

[21] Houénassi D, Tchabi Y, Awanou B, Véhounkpé-Sacca J, Akindès-Dossou Yovo R, Sehonou J, Atadokpédé F, Hounto F, Lawani R, Gnangnon A, d'Almeida-Massougbodji M, Agboton H. Évolution du risque cardiovasculaire des patients traités pour HTA à l'hôpital d'instruction des armées de Cotonou. Annales de Cardiologie et d'Angéiologie 2013; 62: 12–16.

[22] Munyapara SA, Mundu MG, Kakudji IL. Evaluation du risque cardiovasculaire global des patients hypertendus suivis dans les centres médicaux militaires de Kinshasa, RDC. Kisangani Médical 2015; 6 (1): 117-23.

[23] Bruckert E, Bonnelye G, Thomas-Delecourt F et al. Evaluation du risque cardiovasculaire en médecine générale en France. Archives of Cardiovascular Disease 2011; 104: 381-387.

[24] Simon A, Mijiti W, Gariepy J et al. Current possibilities for detecting high risk of cardiovascular disease. International Journal of Cardiology 2006; 110 (2): 146-52.