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Predictive Factors of Coronary Disease in Hypertensive Patients

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Abstract		**Original Research Article**

High blood pressure (hypertension) is a major cardiovascular risk factor and a public health problem in our country. Its implication in the occurrence of coronary disease is well established. However, there is a lack of recommendations that specify which patients should be screened for coronary artery disease. The aim of our study is to determine the predictive factors for the occurrence of coronary disease in the hypertensive population. This study took place over a 12-months period from November 2016 to November 2017, at the ERRAZI hospital in the CHU MOHAMMED VI cardiology department. The recruitment of patients was done from the volunteers of the patients of the service and the consultation. During this period, we identified 300 hypertensive patients, including 200 non-coronary patients and 100 coronary patients. For each patient, an interrogation, a clinical examination and an ECG were performed. Our data were studied first by a bivariate analysis and then the significant variables were finalized by a multivariate analysis. The results of our study showed a significant correlation between the occurrences of coronary disease in hypertensive patients: positive urine test strip, smoking, diabetes, male sex, hypertension duration and non-compliance therapeutic. Thus, we propose screening for coronary heart disease in mostly sedentary and / or smoking hypertensive patients and supplementing this work with other studies to establish a score to calculate the risk of occurrence of coronary heart disease in patients with high blood pressure.

Keywords: Coronary disease, hypertension, predictive factors.

INTRODUCTION

Coronary artery disease is a major cause of death in adults and elderly patients, this in the majority of developed countries and in many emerging countries [1]. Its diagnosis is often late and manifests itself immediately as a major complication. In fact, en 46% of women and 62% of men, the first manifestation of coronary artery disease is a myocardial infarction or sudden death [2].

Hypertension is a major cardiovascular risk factor and a public health problem in our country. Its implication in the occurrence of coronary disease is well established [3]. However, there is a lack of recommendations that specify which patients should be screened for coronary artery disease.

The aim of our study is to determine the predictive factors for the occurrence of coronary disease in the hypertensive population

PATIENTS AND METHODS

This is a case-control epidemiological study, carried out for 12 months between November 2016 and November 2017; assembling 300 patients with arterial hypertension using a well-defined inclusion and exclusion criteria. The patient's recruitment was from volunteers of patients in the cardiology department and/or the different consultation centers: The university hospital Mohammed VI, ARRAZI hospital, Cardiology department of Marrakesh.

The data collection and analysis was made in pre-established farm return based on the interrogatory and clinical examination of patients and the patient's records in the cardiology department.

The anamnesis has allowed pointing out: cardiovascular risk factors; defined by the recommendations of the European society of cardiology; systemic and cardiovascular history.

A complete cardiovascular examination was done after measuring the principal vitals (blood pressure using a validated automatic blood pressure monitor, heart rate, respiratory rate, weight gain in kilograms, height and waist circumference in centimeters with calculation of body mass index, a urinary strip).

All patients underwent an EKG, establishment of lipid profile (HDL, LDL, triglycerides, total cholesterol), a fasting glycemia and a 24 h proteinuria.

A bibliographical research was done, finding papers on the relationship between the arterial hypertension and occurrence of the coronary disease, using MEDLINE library, HINARI, PUBMED and SCIENCE DIRECT.

The statistical and analytical analysis was made using the SPSS software. The Hosmer Meme show test was used to examine the quality of the final logistic regression model. The statistical significance threshold was 5%.

RESULTS

Three hundred cases were collected and evaluated. The average age of the hypertensive population with CAD (coronary artery disease) is 62 with a standard deviation of 10,187. While the average age of the hypertensive population without CAD is 60 with a standard deviation of 9, 8. A clear predominance of women is noted (69% of hypertensive patients without CAD, 50% of hypertensive patients with CAD). The hypertensive population with CAD clearly has more associated risk factors than the hypertensive population without CAD. It is noted that 40% of hypertensive patients without CAD are diabetic (including 29% uncontrolled and 11% controlled). In the hypertensive population with CAD, 50% of patients are diabetic (including 45% uncontrolled and 5% controlled). 28% of hypertensive patients with CAD are smokers, this figure drops to 10% in hypertensive patients without CAD. The dyslipidemia represents a percentage of 25 in each of the two groups.

With a significant predominance of sedentary lifestyle in hypertensive patients with CAD by 82%. While 55% of hypertensive patients without CAD are sedentary. Among 188 women patients included in our study, 147 were postmenopausal (74% of the hypertensive women patients without CAD and 26% of the hypertensive women patients with CAD).

Cardiovascular history (nephropathy, chronic peripheral artery disease (PAOD) and stroke) is clearly predominant in hypertensive patients with CAD. It has been found that the average oldness of hypertension in hypertensive patients without CAD is 5 years, whereas it is 9 years in hypertensive patients with CAD. 80% of hypertensive patients without CAD have a stage 1 hypertension, whereas there is a predominance of stage 2 (49, 5%) and stage 3(40%) in hypertensive patients with CAD. The majority of our patients are receiving a monotherapy (80% hypertensive patients without CAD and 94% hypertensive patients with CAD). Calcium channel blockers are the most used in both groups. The treatment adherence is 88% in hypertensive patients without CAD, while it drops to 79% in hypertensive patients with CAD. At the clinical examination the mean systolic blood pressure is 151 mmHg in hypertensive patients without CAD, while it is 134 mmHg in hypertensive patients with CAD. And the mean diastolic blood pressure is 80 mmHg in hypertensive patients without CAD, while it is 76 mmHg in hypertensive patients with CAD. It is to be noted that obesity represents 55% of hypertensive patients without CAD, whereas it is 28% in hypertensive patients with CAD. The average waist size is 101 cm in hypertensive patients without CAD and 91 cm in hypertensive patients with CAD. Urine dipstick test was positive in 3% of hypertensive patients without CAD and 14% of hypertensive patients with CAD.

In a bi-variate analysis, the qualitative factors that represent a significant statistical relationship with coronary artery disease include the following: Smoking with a p-value of 0.0001, A positive urine dipstick test with a p value of 0.0001, Sedentary lifestyle with a p-value of 0.0001, Male gender with a p-value of 0.002, medication non- adherence with a p-value of 0.023. Whereas quantitative factors that represent a significant statistical relationship with coronary artery disease include the following: The oldness of the hypertension with a P value of 0.0001, systolic blood pressure with a P value of 0.0001, diastolic blood pressure with a p-value of 0.007, The age with a p-value of 0.035.

Table-I: Qualitative factors with CAD in hypertensive patients

Factors	Modality	CAD				p
		No		yes		
		N	%	N	%	
Sexe	F	137	73,3	50	26,7	**0,002**
	M	63	55,8	50	44,2	
Medical adherence	YES	176	69,3	78	30,7	**0,023**
	NO	24	52,2	22	47,8	
Smoking	YES	19	40,4	28	59,6	**<0,0001**
	NO	181	71,5	72	28,5	
Type of smoking	ACTIF	9	31	20	69	0,096
	PASSIF	10	55,6	8	44,4	
Sevrage	YES	5	25	15	75	0,201
	NO	4	50	4	50	
IMC	NORMAL	30	65,2	16	34,8	0,793
	ANORMAL	170	67,1	83	32,9	
Menopause	YES	110	74,8	37	25,2	0,353
	NO	27	67,5	13	32,5	
stroke	YES	4	50	4	50	0,256
	NO	196	67,1	96	32,9	
urine dipstick	POSITIVE	6	30	14	70	**<0,0001**
	NEGATIVE	193	69,2	86	30,8	
Diabete	YES	80	61,5	50	38,5	**0,049**
	NO	120	70,6	50	29,4	
Dyslipidémie	YES	50	66,7	25	33,3	1,000
	NO	150	66,7	75	33 ,3	
Sedentary	YES	111	57,8	81	42,2	**<0,0001**
	NO	89	82,4	19	17,6	

Table-II: Quantitative factors associated with CAD in hypertensive patients

Variable	CAD	N	AVERAGE	Standard deviation	P
Age	NON	200	60.12	9.88	**0.035**
	OUI	100	62.75	10.18	
Oldness of the hypertension	NON	200	5.86	5.06	**0.0001**
	OUI	100	9.64	6.70	
Oldness of the diabete	NON	79	9.59	7.44	0.087
	OUI	49	12.33	9.37	
Systolic blood pressure	NON	200	151.32	22.43	**0.0001**
	OUI	100	134.90	22.15	
Diastolic blood pressure	NON	200	80.01	11.58	**0.007**
	OUI	100	76.09	11.96	

In that respect, we have retained the factors that were significantly correlated and included them in a multivariate model by considering coronary artery disease as a variable of interest. Based on the results of our study : A positive urine dipstick test multiplies the risk of coronary artery disease occurrence in the hypertensive patient by 5.6, the sedentary lifestyle multiplies the risk of coronary artery disease occurrence in the hypertensive patient by 4.5, smoking multiplies the risk of coronary artery disease occurrence in the hypertensive patient by 4, male gender multiplies the risk of coronary artery disease occurrence in the hypertensive patient by 2.41, medication non-adherence multiplies the risk of coronary artery disease occurrence in the hypertensive patient by 2.2, diabetes multiplies the risk of coronary artery disease occurrence in the hypertensive patient by 1.8, The oldness of hypertension increases the risk of coronary artery disease occurrence in hypertensive patient each year by 1.1.

Table-III: Results of multivariate analysis

La variable	P	Ods ratio
Positive urine dipstick	0.004	5.64
Sedentary	<0.0001	4.55
Smoking	<0.0001	4.08
Male gender	0.005	2.41
Medication Non adherence	0.048	2.18
Diabete	0.047	1.80
Oldness of Hypertension	0.0001	1.10

DISCUSSION

The arterial hypertension is a major cardiovascular risk factor, it is a major public health problem in our country and its involvement in the occurrence of coronary disease is well known.

Our study showed a significative correlation between the occurrence of coronary disease in hypertensive patients and: positive urinary strip, smoking, diabetes, male patients, the noncompliance with the medical treatment and the oldness of the hypertension.

The advanced age of hypertensive patients multiplies by 4 the risk of occurrence of the coronary disease in the Bouhanick study [4], though in our study there was no proven relationship between the two parameters.

The American heart association static update [5], reported that hypertensive male patients develop coronary heart disease much more than hypertensive female patients. This is consistent with the data in our series where hypertensive males are 2.4 times more likely to develop coronary heart disease than hypertensive females (p=0.002, OR=2.4).

According to the results of Our series, there was no objective link between a decrease in PAS or PAD and the occurrence of coronary heart disease in hypertensive patients, which is inconsistent with literature data, where a 10mmgh decrease in PAS decreases the risk of coronary heart disease in hypertensive patients by 25% [6, 7] and a 5mmgh decrease in PAD decreases the risk of coronary heart disease in hypertensive patients by 21% [8].

According to our study, the older the hypertension, the greater the risk of coronary heart disease (p= 0.0001, OR=1.1), and there are no articles in the literature that study this correlation.

The treatment adherence is a real problem that the patient and the doctor face. There was a noncompliance with the medical treatment in our case. Multiple factors can influence it as the patient's age and profession, his monthly income, the method of treatment and its price.

The medical compliance decreases the risk of development of coronary diseases by 38% according to a European study by Mazzaglia and al made in 2009 in patients with arterial hypertension; which joins the results found in our study : the noncompliance to the medical treatment multiplies the risk of the development of the coronary disease by 2 (p=0.023, OR=2.18).

The risk of developing a coronary disease is more important in hypertension smoking patients. According to Framingham's [9] and Milan and al [10] smoking hypertensive patients have tendency to develop coronary diseases at a younger age than the nonsmoking hypertensive patients.
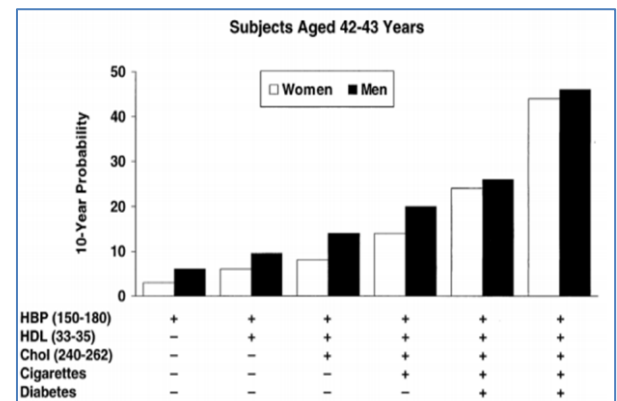

Fig-1: Framingham study

This joins the results found in our series where tobacco multiplies the risk of coronary disease in hypertensive patients by 4 (p=0.0001, OR=4.08). And according the same studies [9, 10], hypertensive patients with diabetes has higher risk to develop coronary disease. This goes with the results found in our study: diabetes multiplies the risk of coronary disease by 1.8 in hypertensive patients.
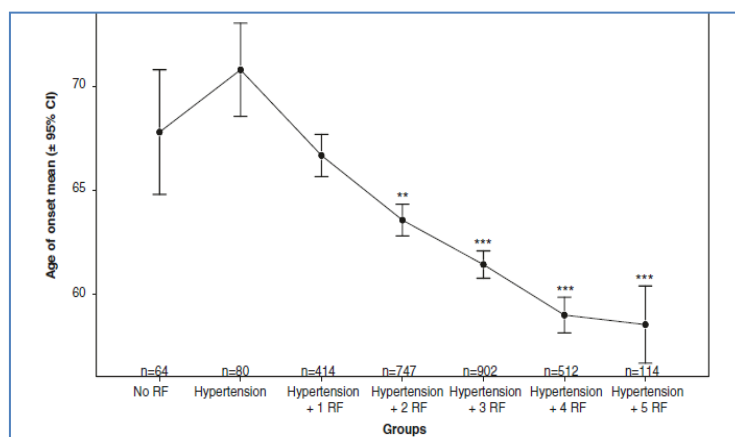

Fig-2: Milane *et al*. study [58]

We found in our results that there was no significant relationship between dyslipidemia and the occurance of coronary disease; on the contrary it was proven by Framingham's [9] and Milan and al [10] studies that there was a bigger chance of developing a coronary diseases in hypertensive patients with dyslipidemia.

As found in the results of our study, sedentary lifestyle increases significantly the risk of occurrence of coronary heart disease in hypertensive patients; we didn't find any paper in the literature that studies this correlation.

Obesity increases the risk of developing coronary artery disease in hypertensive patients, according to Milane *et al*. [10], whereas in our patients there was no statistically significant relationship between obesity and the occurrence of coronary artery disease.

The hypertensive patient with positive proteinuria has a higher risk of developing coronary artery disease according to the R. dumaine study [11] and according to the results of our Our series a positive urine test strip in a hypertensive patient multiplies his risk of developing coronary artery disease by 5.6.

CONCLUSION

Hypertensives today, are a challenge. A full understanding is needed of the variety of relevant risk factors, while structured interdisciplinary teams are required to prioritize the appropriate therapeutic measures. Thus, we propose screening for coronary heart disease in mostly sedentary and/or smoking hypertensive patients and supplementing this work with other studies to establish a score to calculate the risk of occurrence of coronary heart disease in patients with high blood pressure.

Also a comprehensive patient assessment, individualized diagnosis and therapy, open and regular communication between physician and patient, close coordination of health care services, continuous monitoring of the care provided and the results obtained, will bring benefits in reducing hypertension-related CV morbidity and mortality.

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