Original research article

Epidemiological, Clinical and Preventive Aspects of Hypertension at Diabetic Patients in Butembo, Democratic Republic of the Congo

ABSTRACT

Aims: This survey aimed to determine factors incriminated in the outcome of the HTA among diabetic patients attending the diabetics follow up center of Matanda hospital.
Methodology: We carried out a descriptive cross-sectional survey during 3 months, from October to December 2015 at the diabetics follow up center of Matanda hospital.
Results: The global frequency of the HTA among diabetic patients followed at Matanda hospital was 63.1% either 101 patients out of 160 diabetic patients. 63.9% of the diabetic women presented HTA. 81.3% of diabetic patients aged of more than 60 years present the HTA. 65.5% of diabetic patients with HTA have a normal BMI (18.5-24.9Kg/m^2). The HTA was diagnosed in 30% of patients after diabetes. 17.5% of our patients had a HTA of grade 1, 12.5% for HTA of grade 2, 6.2% for HTA of grade 3 and 20.6% for the isolated systolic HTA. 52% of patients with HTA are taking cardioaspirin in prevention of cardiovascular complications of diabetes and 65.2% of them respect the diabetic diet. The regular physical activity is done in 42.1% by patients with HTA.
Conclusion: Hypertension is an important problem in the diabetic population. Thus, care and prevention would be of paramount importance.

***Key-words**: Hypertension, Diabetes, Prevention, cardiovascular complications, D.R. Congo*

1. INTRODUCTION

Hypertension (HTA) is a factor of cardiovascular risk in the general population but it is more frequent and more serious among diabetic patients. These one are touched in 20-60%. The coexistence of the diabetes and the HTA amplifies the risk of the cardiovascular disease, which is the reason of about 85% of death among diabetic patients [1].
Indeed, the studies of this last decade demonstrate the imperious necessity to normalize the arterial pressure at diabetic patients. These patients are especially exposed to the cardiovascular accidents and the arterial pressure would not know how to be dissociated of the other risk factors. Thus, the management of the HTA must integrate other therapeutic objectives that are the stop of tobacco, the balance of the diabetes and dyslipidemia [2].
Therefore, this survey aimed to determine factors incriminated in the outcome of the HTA among diabetic patients attending the diabetics follow up center of Matanda hospital.

2. MATERIAL AND METHODS

This survey was done at the diabetics follow up center of Matanda hospital. This center has 300 regular diabetic patients. The follow up is done once per week for the control of glycaemia, searching for complications of diabetes mellitus (DM) and other pathologies related to the DM and their management.
We carried out a descriptive cross-sectional survey during 3 months, from October to December 2015. Our sample was exhaustive according to selection criteria. Were included in this survey all known diabetic patients followed at the diabetics follow up center of Matanda hospital at the outpatient service. All pregnant women with DM, patients less than 18 years and those who did not consent were excluded.
Data collection was done through a based questionnaire interview and a clinical examination.
The diagnosis of the DM was kept when the dosage of the glycaemia revealed glycaemia on an empty stomach superior to 1.26 g/L, either 7mmol/L; or a glycaemia at any moment of the day superior to 2 g/L,

either 11.1mmol/L; or a glycaemia at the second hour of the HGPO superior or equal to 2 g/L, and this on two occasions at the minimum [1].
The HTA has been defined according to the norms of the High Authority of Health (HAH) identical to the one of the WHO: among all subjects, the optimal arterial pressure is fixed in 120/80 millimeter of mercury (mmHg) and the HTA is defined for numbers passing 140/90 mmHg [3].
Statistical analysis was done by the software Epi-info version 3.5.4 of July 30, 2012.

3. RESULTS

3.1. Epidemiological aspects

The global frequency of the HTA among diabetic patients followed at Matanda hospital was 63.1% either 101 patients out of 160 diabetic patients. 63.9% of the diabetic women presented HTA. 81.3% of diabetic patients aged of more than 60 years present the HTA. 65.5% of diabetic patients with HTA have a normal BMI (18.5-24.9Kg/m^2). (Table I).

3.2. Clinical aspects

The distribution of patients regarding the value of the arterial pressure recovered at the time of the measure of this one is shown in the figure 1. The table 2 shows the distribution of the patients according to their clinical aspects. The HTA was diagnosed in 30% of patients after diabetes. From the same table, it is shown that 17.5% of our patients had a HTA of grade 1, 12.5% for HTA of grade 2, 6.2% for HTA of grade 3 and 20.6% for the isolated systolic HTA.

3.3. Preventive aspects

It is shown from the table 3 that 52% of patients with HTA are taking cardioaspirin in prevention of cardiovascular complications of diabetes and 65.2% of them respect the diabetic diet. The regular physical activity is done in 42.1% by patients with HTA.

4. DISCUSSION

4.1. Epidemiological aspects

The overall frequency of hypertension in diabetic patients attending the Matanda hospital was 63.1%, i.e. 101 patients out of a total of 160 diabetic patients. A study in Canada, from 2006 to 2007, reported a frequency of 62.6% of adults with diabetes mellitus who also had hypertension [3]. Although the prevalence of the association of diabetes and hypertension is known in developed countries, in Africa, on the other hand, it is not well known. However, studies in Mali in 2000, Madagascar in 2010 and Morocco in 2012 found the association of diabetes and hypertension respectively in 16.7%, 39.6% and 69.5% of cases [4-6]. Thus, the frequency found in our study is close to those found in Canada and Morocco. Prevalence of hypertension, in the whole population (diabetic or not) is on the rise in most African countries while control remains poor [7].
The female sex was the most affected at a frequency of 63.9% against 36.1% for the male sex with a sex ratio of 0.56 in favour of the female sex. This is usually encountered in epidemiological studies of the general population, with women being more susceptible to health problems. The excess male mortality of diabetes mellitus has already been reported by other authors [6] and could explain the female predominance that we have noted. Indeed, Grimaldi *et al.* reported, in their study on the epidemiology of cardiovascular complications of diabetes, that all the global epidemiological studies lead to an increase by diabetes mellitus of the relative risk of cardiovascular morbidity mortality with a tendency to the equalization of the absolute risk between men and women with diabetes, the latter losing much of their natural protection before menopause [8].
Our results show that 81.3% of patients with diabetes over the age of 60 years have hypertension, 52.7% of patients between 40 and 60 years of age, and 9.0% of patients under 40 Years. This illustrates that the frequency of hypertension increases with age in the diabetic population. Indeed, age greater or equal than 50 years for men and greater or equal than 60 years for women constitute a risk factor for the occurrence of cardiovascular complications in diabetic patients [3]. And it is said that the blood pressure

(BP) changes with the advancement of age from the predominant diastolic BP in the young to the predominant systolic BP in the older person. This shift is due to the stiffening of the large arteries as a result of the ageing process and the replacement of the elastic fibers with collagen fibers resulting in the loss of compliance and the elastic recoil of these vessels [9].

4.2. Clinical aspects

According to our results, 65.5% of patients with normal BMI, i.e. BMI between 18.5 and 24.9 Kg / m2, have hypertension. There is a close correlation between these disorders and the increase in BMI [3]. The measurement of the blood pressure of our patients revealed that 12.5% of our patients had optimal blood pressure, 33.1% normal non-optimal blood pressure and 8.7% limit blood pressure. The remainder of our sample consisted of hypertensive patients, with 20.6% had isolated systolic hypertension, 17.5% had HTA grade 1, 12.5% had HTA grade 2, and 6.2% had hypertension Grade 3. The high rate of isolated systolic hypertension was related to the fact that most of our patients were old-age: about half were over 60 years old. Indeed, all individuals, at a more or less advanced age, have numerous atherosclerotic plaques, localized exclusively in the intima of their arteries of large and medium calibres [9,10], and both Systolic blood pressure (SBP) and diastolic blood pressure (DBP) are equally important to analyze the associations between blood pressure and its associated risk covariates [11]. Regarding the timing of hypertension in the diagnosis of diabetes mellitus, 15.6% of cases of hypertension occurred before diabetes mellitus, 17.5% were diagnosed at the same time as diabetes mellitus and 30.0% after diabetes mellitus. It should be noted that 67.1% of patients with type 2 diabetes are hypertensive compared to 30.1% of patients with type 1 diabetes who are hypertensive. Laboureau et al., cited by Khadija, found in type 1 diabetics a prevalence of hypertension of 14.7% versus 4.4% in the general population of identical age, whereas in diabetics of type 2, 80% were hypertensive (blood pressure > 140/90 mm Hg) [12].

4.3. Preventive aspects

According to our results, 80.6% of patients not receiving cardioaspirin presented the HTA. The regular intake of cardioaspirin in a diabetic patient is a protective factor against hypertension.

The Hypertension Optimal Treatment (HOT) trial examined the effect of 75 mg ASA per day in a subgroup of 1501 high-risk individuals with diabetes and hypertension. Less than 10% of the subjects showed clinical signs that they had already had a myocardial infarction, stroke or other coronary artery disease. In all subjects in the HOT trial, ASA reduced the risk of all cardiovascular events by 15% and the risk of myocardial infarction by 36%. Acetylsalicylic acid (ASA) is the platelet antiaggregant that has been the most studied for the prevention of cardiovascular events in people with diabetes. A number of trials on primary, mixed (primary and secondary) and secondary cardiovascular events were conducted to investigate the effect of ASA in the presence of diabetes and their results varied [13]. The US Physicians Health Study was a primary prevention trial in which a subgroup of 533 male physicians with diabetes had taken 325 mg of ASA every two days. ASA reduced the risk of myocardial infarction by 60%, but the results were not significant due to the small number of events (11/275 in the ASA group compared to 26 / 258 in the placebo group, p = 0.22). The Primary Prevention Project (PPP) trial examined the effect of a low dose of ASA (100 mg / day) in more than 1,000 people with diabetes. In this trial, there was a negligible decrease in the number of major cardiovascular events (RR: 0.90, 95% CI: 0.50 to 1.62) and a non-significant increase of 23%, of the number of cardiovascular deaths [13]. However, there was a significant reduction, 41%, in the number of major cardiovascular events in non-diabetic patients. In the presence of diabetes, there are various alterations in platelet function that may predispose the patient to the enhancement of platelet activation and thrombosis, including increased platelet turnover and platelet aggregation, and then thromboxane synthesis [13].

As for the frequency of hypertension in the diet, 65.2% of diabetic patients have hypertension, while 60.6% of non-adherent patients developed hypertension. The diabetic diet recommended at Matanda hospital would be adapted according to the standards of dietetics. Indeed, it is well demonstrated by other authors that nutritional therapy can improve glycaemic control by reducing glycosylated haemoglobin (HbA1c) by 1.0 to 2.0% and that it is associated with other components of dialectological care, it can further improve clinical and metabolic outcomes. However, nutritional therapy must be tailored to the needs of the patient and regularly evaluated and strengthened intensively and included in self-management education programs [14,15]. Since there is little data on the strict adherence of a particular

nutritional prescription, nutritional therapy and meal planning need to be adapted according to preferences, age, needs, culture, lifestyle , The economic situation, the level of physical activity and the desire to change the patient. In general, people with diabetes should follow the healthy diet recommended for the general population in Eating Well with Canada's Food Guide, which consumes a variety of foods from the four groups (vegetables and fruits, cereal products, Dairy products and substitutes, meat and substitutes) [16].

69.6% of patients' not practicing regular physical activity had hypertension. Our results clearly show that 42.1% of patients practicing physical activity on a regular basis developed hypertension versus a proportion of 69.6% for non-practitioners.

Thus, regular physical activity is a protective factor against hypertension in a diabetic patient. Physical exercise especially aerobic improves cardiorespiratory health in both type 1 diabetes and type 2 diabetes and has recently been shown to reduce the risk of peripheral neuropathy. Physical activity can help people with diabetes achieve various goals, such as improving their cardiorespiratory health, increasing their vigor, controlling their blood sugar, reducing their insulin resistance, improving their lipid profile and maintaining their weight after losing weight. Here, "physical activity" and "exercise" are used interchangeably [14,17].

A systematic analysis and meta-analysis revealed that supervised programs with aerobic exercise or resistance exercise improve glycaemic control in adults with type 2 diabetes. Physical activity and cardiorespiratory Are associated with significant reductions in morbidity and mortality in both men and women regardless of the type of diabetes mellitus [17].

5. CONCLUSION

Hypertension is an important problem in the diabetic population. Thus, care and prevention would be of paramount importance. Diabetic patients with hypertension must be encouraged for taking cardioaspirin daily, but also health care must prescribe to them in a systematic way in order to prevent cardiovascular complication. Diabetic patients have to respect the recommended hygiene-dietary measures in particular the strict respect of the diabetic diet and regular realization of physical exercise compatible with their health state. Experts in nutrition-dietetics have to review the diabetic diet followed in our environment in order to improve it.

CONSENT

All patients signed a consent format freely and were free to withdraw it.

Table1. Epidemiological distribution of diabetic patients with HTA

Variables	Number of patients	Number of patients with HTA (%)
Sex		
Female	111	71 (63.9)
Male	49	30 (61.2)
Total	**160**	**101 (63.1)**
Age (years)		
<40	11	1 (9.0)
40-60	74	39 (52.7)
>60	75	61 (81.3)
Total	**160**	**101 (63.1)**
BMI		
< 18.5	15	4 (26.7)
18.5- 24.9	84	55 (65.5)
25- 29.9	42	28 (66.7)
> 30	19	13 (68.4)
Total	**160**	**126 (78.8)**

Table2. Clinical aspects of HTA at diabetic patients

Variables	n	%
HTA diagnosis		
Before diagnosis of DM	25	15.6
Same time as DM	28	17.5
After DM	48	30.0
Not HTA	59	36.9
Total	**160**	**100**
WHO Classification of HTA		
Hypertension grade 1	28	17.5
Hypertension grade 2	20	12.5
Hypertension grade 3	10	6.2
Isolated Systolic Hypertension	33	20.6
Limit	14	8.7
Normal	53	33.1
Optimal	20	12.5
Total	**160**	**100**

Table3. Prevention aspects of HTA at diabetic patients

Variables	Number of patients	Patients with HTA	% of patients with HTA
Type of diabetes			
Type 1	15	9	30.0
Type 2	84	67	67.1
Total	**160**	**126**	**78.8**
Cardioaspirin taking			
Yes	98	51	52.0
No	62	50	80.6
Total	**160**	**101**	**63.1**
Diabetic diet respect			
Yes	89	58	65.2
No	71	43	60.6
Total	**160**	**101**	**63.1**
Regular physical activity			
yes	38	16	42.1
No	122	85	69.6
Total	**160**	**101**	**63.1**

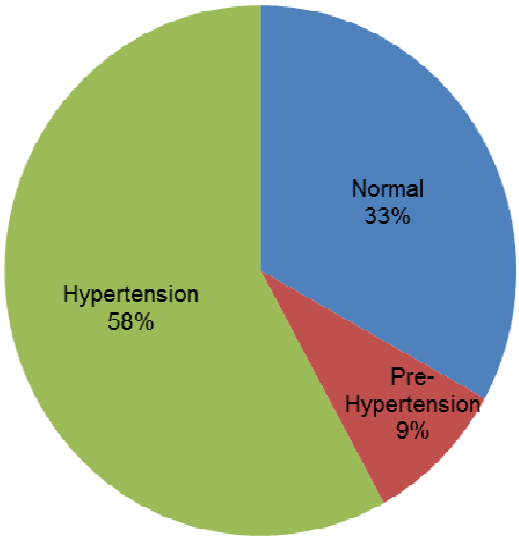

Figure 1. Distribution of patients regarding the value of the arterial pressure

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