SAS Journal of Medicine
Abbreviated Key Title: SAS J Med
ISSN 2454-5112
Journal homepage: https://saspublishers.com

OPEN ACCESS

Internal Medicine

Therapeutic Aspects of Hypertension in Type 2 Diabetics at the National Diabetes Control Centre in Bamako, Mali

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DOI: 10.36347/sasjm.2023.v09i06.008 | **Received:** 27.04.2023 | **Accepted:** 01.06.2023 | **Published:** 06.06.2023

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Abstract **Original Research Article**

Introduction: African populations, and particularly those living in Mali, are confronted with the emergence of chronic diseases whose treatment and monitoring represent an additional economic problem for them. Previously unknown, these diseases have grown to become a real public health problem. Hypertension and diabetes mellitus frequently coexist in the general population. The objectives were to study the therapeutic aspects of hypertension in patients with type 2 diabetes. ***Methodology***: This was a retrospective study conducted at the National Diabetes Control Centre (CNLD) in which we reviewed the records of diabetic patients with hypertension from February 22 to May 16, 2020. ***Results***: More than half of the patients were elderly, that is 62%, with a modal average age ranging from 65 to 74 years (58%). The timethe diabetes has had to progress was more than 5 years in 64% of the cases and that of hypertension was more than 5 years in 55% of the cases. Diabetes imbalance based on glycated haemoglobin (HbA1c) was observed in 84% of cases. Urinary albumin excretion was observed in 33% of cases (diabetic and/or hypertensive nephropathy) but only 5% had proven renal failure. Based on anti-diabetes therapy, 59% of the cases were treated with oral antidiabetics (ADO), 41% with insulin therapy. With respect to the antihypertensive therapy, 71% of the cases were on monotherapy. The antidiabetic drugs used in our patients were, in decreasing order of frequency, oral antidiabetic drugs (OADs) in 59% of cases and insulin therapy in 41% of cases. This therapeutic choice had no statistically significant relationship with the number of risk factors, diabetes control, hypertension, and metabolic syndrome. Of these, 69% had good adherence to therapy. The number of antihypertensive drugs used was monotherapy (71%) and dual therapy (29%). There was no statistically significant relationship with the number of risk factors, diabetes control, hypertension, and metabolic syndrome. Of these, 51% had good adherence to therapy. ***Conclusion*:** The investigations we have conducted have made it possible to understand that hypertension and diabetes, two diseases that were unknown until the middle of the 20th century in Mali, are affecting more and more people in this country. Hypertension and diabetes mellitus frequently coexist in the general population. Clearly, the state of these two diseases is still underestimated. It is now necessary to systematically screen the national population for these diseases in order to enable modern medicine to fight against these scourges.

Keywords: Diabetes; Hypertension, Therapeutic, CNLD.

INTRODUCTION

African populations, and particularly those living in Mali, are confronted with the emergence of chronic diseases whose treatment and monitoring represent an additional economic problem for them. Previously unknown, these diseases have grown to become a real public health problem.

Hypertension and diabetes mellitus frequently coexist in the general population. The prevalence of the hypertension-diabetes association in Mali, estimated at 16.7%, is in line with that of other African countries [1]. Furthermore, diabetes is known to favor the development of hypertension through various complex mechanisms, while hypertension is also known to be a risk factor for the development of type 2 diabetes (T2D) [2]. The analysis of the relationship between hypertension and type 2 diabetes shows both a great pathophysiological complexity and a significant heterogeneity of the situations encountered in clinical

practice [2]. In sub-Saharan Africa, hypertension is the main cardiovascular risk factor associated with diabetes [3] This association concerns a particular population of patients characterized by a state of insulin resistance where the triad of atherogenic dyslipidaemia (hypertriglyceridaemia, low HDL-cholesterol, excess LDL-cholesterol), as well as the existence of android obesity, is also present [3]. Half of the diabetic patients were hypertensive in the PROCAM study, and the prevalence of hypertension was three times higher in diabetic patients than in non-diabetic patients. The Overall Interheart and African Interheart studies showed that hypertension is more closely associated with the occurrence of myocardial infarction (MI) in Africans than in other populations; whereas, for diabetes, the relative risk of developing MI is identical for all populations studied: 24% of African MI cases had diabetes [4]. In addition to cardiovascular complications, renal complications of diabetes are also of concern [1]. Approximately 18 million people die each year from cardiovascular disease, mainly due to risk factors such as diabetes mellitus or hypertension. [5] Both of these conditions are major cardiovascular (CV) and renal risk factors. Dembélé reported in Mali that the prevalence of hypertension in patients with type 2 diabetes was 29% [4], as did Lokroua in Côte d'Ivoire [5] and Akintewe in Nigeria, who both found a prevalence of 31% [6]. It is in view of the high frequency of the association of these two major cardiovascular risk factors, which leads to therapeutic difficulties and complications, that we undertook this study, and our objectives were as follows.

METHODOLOGY

This was a retrospective study conducted at the National Diabetes Control Centre (CNLD) in which we reviewed the records of diabetic patients with hypertension from February 22 to May 16, 2020.

It includes patients aged 35 years and over seen in consultation without distinction of gender, race, ethnicity, or occupation.

Our study included 75 patients with type 2 diabetes,by setting a confidence interval of 95%; a power of 80%; alpha error of 5%; and an age of 35 years or more.

All consenting type 2 diabetic patients with hypertension who attended the National Diabetes Control Centre (CNLD) were included in this study.

Socio-demographic data: surname, first name, age, sex, occupation, residence, ethnicity, smoking, physical activities, duration of diabetes and hypertension, family history of hypertension and diabetes.

The type of diabetes therapy: Insulin or oral antidiabetics. The number of antihypertensive molecules: mono, dual or triple therapy, therapeutic compliance.

The data were recorded and analyzed with SPSS 20 software. The Chi-2 test was used for comparison of proportions. The threshold of p<005 was considered statistically significant.

RESULTS

This was a retrospective study conducted at the National Diabetes Control Centre (CNLD) in which we reviewed the records of diabetic patients with hypertension under treatment.

From 22 February to 16 May 2020, we recorded 75 patients with type 2 diabetes presenting with hypertension among 169 type 2 diabetic patients seen at the National Diabetes Control Centre (CNLD).

More than half of the patients were elderly, that is 62%, with a modal average age ranging from 65 to 74 years (58%). The time the diabetes has had to progress was more than 5 years in 64% of the cases and that of hypertension was more than 5 years in 55% of the cases. Diabetes imbalance based on glycated haemoglobin (HbA1c) was observed in 84% of cases. Urinary albumin excretion was observed in 33% of cases (diabetic and/or hypertensive nephropathy) but only 5% had proven renal failure. Based on anti-diabetes therapy, 59% of the cases were treated with oral antidiabetics (ADO), 41% with insulin therapy. With respect to the antihypertensive therapy, 71% of the cases were on monotherapy.

Non-adherence was observed in 31% of cases for diabetes, and 49% of non-adherence for hypertension.

About 58% of the patients with well-controlled diabetes were on oral antidiabetics (OADs) and 59% of the patients who were not well-controlled were on oral antidiabetics (OADs). Thus, there was no significant difference between type of diabetes medication and diabetes control *(P=0,980)*.

Approximately 72% of patients on monotherapy did not have controlled blood pressure and 64% of those with at least two therapies did not have controlled blood pressure. There was no statistically significant relationship between the controlled hypertension and the number of antihypertensive drugs.

The antidiabetic drugs used in our patients were, in decreasing order of frequency, oral antidiabetic drugs (OADs) in 59% of cases and insulin therapy in 41% of cases. This therapeutic choice had no statistically significant relationship with the number of risk factors, diabetes control, hypertension, and

metabolic syndrome. Of these, 69% had good adherence to therapy.

The number of antihypertensive drugs used was monotherapy (71%) and dual therapy (29%). There was no statistically significant relationship with the number of risk factors, diabetes control, hypertension, and metabolic syndrome. Of these, 51% had good adherence to therapy.

DISCUSSION

From February 22 to May 2020, we recorded 75 type 2 diabetic patients with hypertension among 169 type 2 diabetic patients seen in consultation at the National Diabetes Control Centre (CNLD).

More than half of the patients were elderly, that is 62%, with a modal average age ranging from 65 to 74 years (58%). These results are superior to those of Coulibaly D *et al*., [8], and Koné B *et al*., [9] who found respectively a proportion of 47.60% and 47.30% of patients aged between 45 and 65 years. According to the International Diabetes Federation, nearly 50% of adults with diabetes are between 40 and 59 years old[10].The time the diabetes has had to progress was more than 5 years in 64% of the cases and that of hypertension was more than 5 years in 55% of the cases. These results are superior to those of Guindo I *et al*., [11] who found 38% of the cases with a duration of diabetes of more than 5 years and 45% of the cases with a duration of hypertension of more than 5 years. Diabetes imbalance on the basis of glycated haemoglobin (HbA1c) was observed in 84% of cases. This result is much higher than that of Drago A *et al*., [12] who found a proportion of 58% of diabetics with poorly balanced diabetes.

Urinary albumin excretion was observed in 33% of cases (diabetic and/or hypertensive nephropathy) but only 5% had proven renal failure. Koné B *et al*., [9] found in their studies 22% of cases of microalbuminuria with 4.7% of cases of renal failure.Based on anti-diabetes therapy, 59% of the cases were treated with oral antidiabetics (ADO), 41% with insulin therapy. This result is comparable to that of Guindo I *et al*., [11] who found 57% of cases treated with oral antidiabetics (OADs) and 43% of cases with insulin.With respect to the antihypertensive therapy, 71% of the cases were on monotherapy, much higher than that of Koné B *et al*., [9] who found a proportion of 35%.

Non-adherence to therapy was observed in 31% of cases for diabetes. In a study by Michel T *et al*., [12], 69% of patients were non-adherent for diabetes treatment, a difference that can be explained by the advanced age and the large sample size. And 49% were non-adherent for hypertension. This is significantly higher than the 29% observed in a study by Gabrielle K Y Lee *et al*., [13], on 1073 diabetic and hypertensive populations.

Approximately 58% of patients with well-controlled diabetes were on oral antidiabetic drugs (OADs) and 59% of patients who were not well-controlled were on oral antidiabetic drugs (OADs). Therefore, there was no significant difference between the type of antidiabetic drug and diabetes control (P=0.980). In a series by Koné B *et al*., [9], 44.4% of patients were treated mainly with oral antidiabetic drugs (OADs), with a statically significant relationship between the choice of antidiabetic drug and diabetes control.

Approximately 72% of patients on monotherapy did not have controlled blood pressure and 64% of those with at least two therapies did not have controlled blood pressure. There was no statistically significant relationship between the controlled hypertension and the number of antihypertensive drugs. In a series by Koné B *et al*., [9], 34.5% of patients were on monotherapy and 48% had a controlled blood pressure - a statically significant relationship was observed between the number of antihypertensive drugs and lesion control.

The antidiabetic drugs used in our patients were, in decreasing order of frequency, oral antidiabetic drugs (OADs) in 59% of cases and insulin therapy in 41% of cases. This therapeutic choice had no statistically significant relationship with the number of risk factors, diabetes control, hypertension, and metabolic syndrome. Of these, 69% had good adherence to therapy. In the series by Coulibaly D *et al*., [8], the antidiabetic drugs used were oral antidiabetic drugs (OADs) in 68% of cases, insulin in 26% of cases and mixed treatment (insulin+OADs) in 6% of cases, with no statistically significant relationship between this therapeutic choice and the metabolic syndrome.

The number of antihypertensive drugs used was monotherapy (71%) and dual therapy (29%). There was no statistically significant relationship with the number of risk factors, diabetes control, hypertension, and metabolic syndrome. Of these, 51% had good adherence to therapy. In a series by K Bertal Filali *et al*., [14], antihypertensive medication was used as monotherapy in 56% of cases, 25% as dual therapy and 18% as triple therapy. There was no statistically significant relationship between the number of antihypertensive medications and other cardiovascular risk factors, but the relationship between antihypertensive treatment and degenerative complications was statistically significant.

Annexes:

Table 1: Distribution according to therapeutic adherence

Therapeuticadherence	Anti-diabeticmedication	Antihypertensive
Yes	52	38
No	23	37

Table 2: Distribution according to diabetes control and type of diabetes therapy

Diabetes control	Type of diabetestreatment		Total
	OAD	Insulin	
Balanced patients	58%(n=7)	42%(n=5)	12
Unbalanced patients	59%(n=37)	41%(n=26)	63
Total	44	31	75

Table 3: Distribution by diabetes control and type of antihypertensive treatment

Diabetes control	Type of treatment for hypertension		Total
	Monotherapy	At least one dual therapy	
Balanced patients	15%(n=8)	18%(n=4)	12
Unbalanced patients	85%(n=45)	82%(n=18)	63
Total	53	22	75

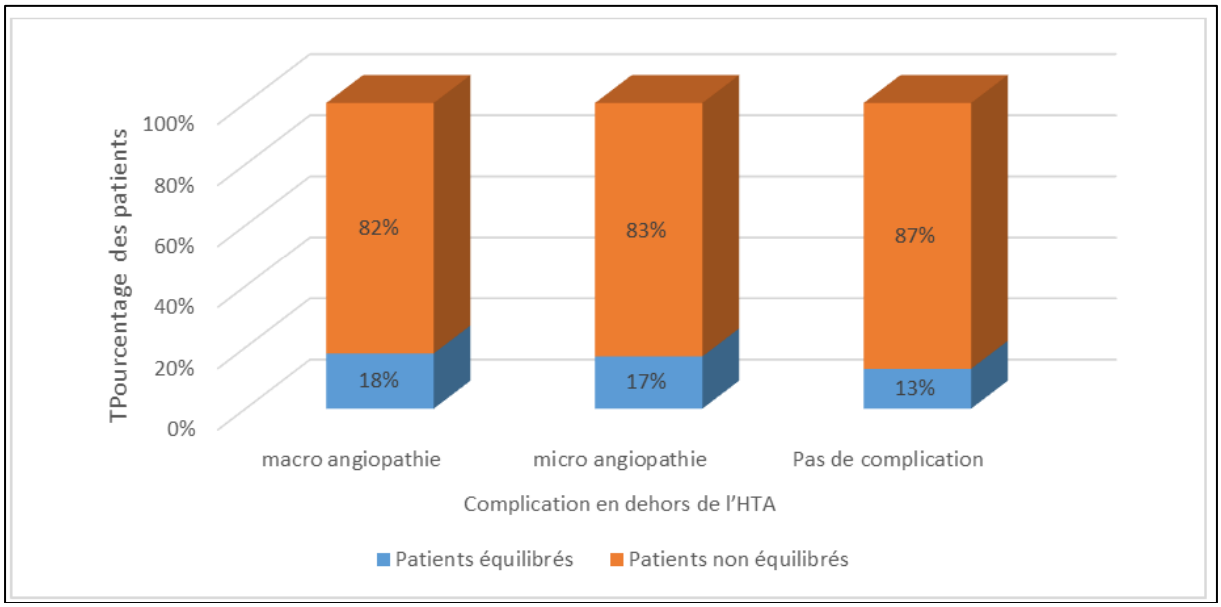

Figure 1: Representation according to diabetes control and type of complication

82% of our patients with macroangiopathy had poorly controlled diabetes or (P=0,816);

Table 4: Distribution according to the balance of hypertension and the type of diabetes therapy

Balance of hypertension	Type of diabetestreatment		Total
	OAD	Insulin	
Balanced patients	27%(n=12)	35%(n=11)	23
Unbalanced patients	73%(n=32)	65%(n=20)	52
Total	44	31	75

Table 5: Distribution according to the balance of hypertension and the type of antihypertensive

Balance of hypertension	Type of treatment for hypertension		Total
	Monotherapy	At least one dual therapy	
Balanced patients	28%(n=15)	36%(n=8)	23
Unbalanced patients	72%(n=38)	64%(n=14)	52
Total	53	22	75

Table 6: Distribution according to the balance of hypertension and the type of complication

Balance of hypertension	Complications otherthan hypertension			TOTAL
	macroangiopathy	microangiopathy	No complications	
Balanced patients	23%(n=5)	38%(n=11)	29%(n=7)	23
Unbalanced patients	77%(n=17)	62%(n=18)	71%(n=17)	52
Total	22	29	24	75

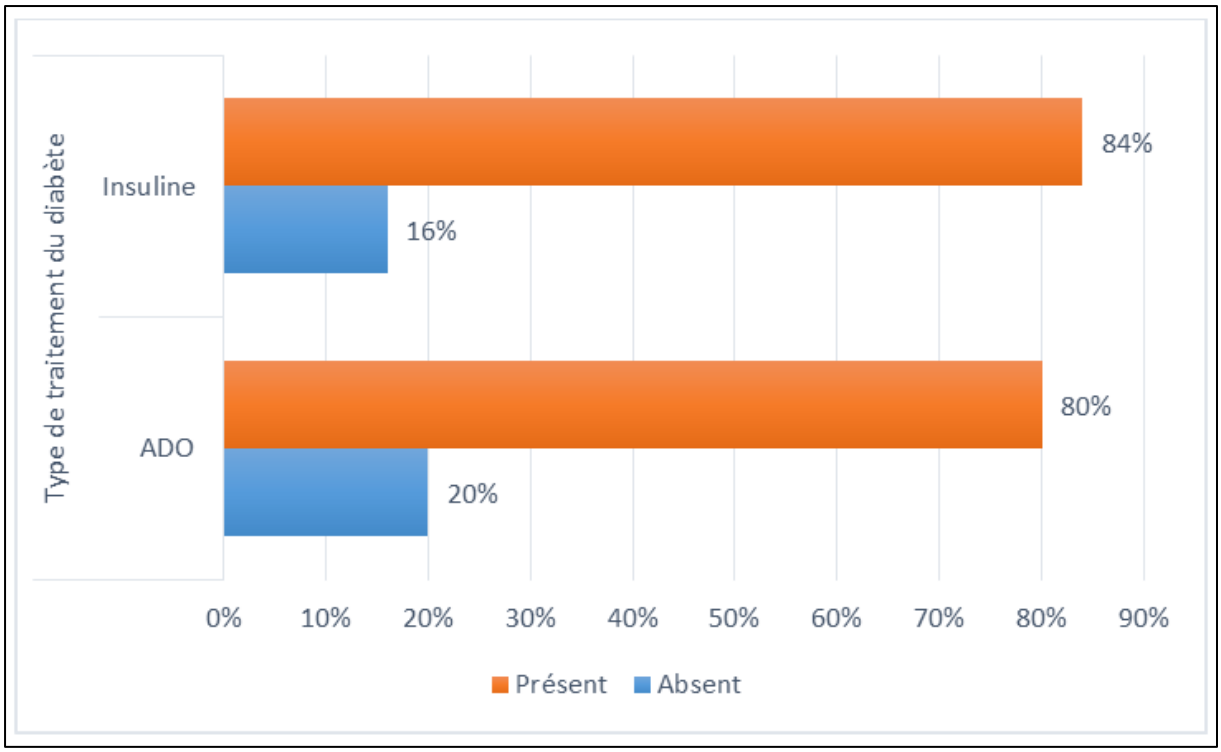

Figure 2: Representation by type of diabetes treatment and presence of metabolic syndrome

CONCLUSION

The investigations we have conducted have made it possible to understand that hypertension and diabetes, two diseases that were unknown until the middle of the 20th century in Mali, are affecting more and more people in this country.

Clearly, the state of these two diseases is still underestimated. It is now necessary to systematically screen the national population for these diseases in order to enable modern medicine to fight against these scourges.

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