

Eye Damage During Malignant Arterial Hypertension at the Donka National Hospital in Conakry

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Abstract

Introduction: This study described the different eye injuries among patients with malignant hypertension associated with cardiovascular comorbidity.

Patients and method: We included in our study all hypertensive patients with blood pressure figures greater than 180 mmHg/120 mmHg, who had stage III or IV hypertensive retinopathy on examination according to Keith and Wagener's classification. For each patient, we measured visual acuity with optotypes, eye examination with the biomicroscope, then visualisation with the volk lens the posterior segment (fundus' eye). We performed descriptive statistics followed by exact chi-two or Fisher tests followed by logistic regression.

Results: Of 279 hypertensive patients received, we recorded a frequency of 16.49% of malignant arterial hypertension. Patients had an average age of 44 ± 13.6 years; men were the most numerous (59.1%) and 59.1% out of school. Heart diseases (70.5%) and kidney diseases (65.9%) were most associated with malignant hypertension. Clinically, ocular symptoms were dominated by visual blurring and decreased visual acuity, 84.1% and 56.8% respectively. Retinal haemorrhage and exudates were 79.5% and 65.9%, respectively. Hypertensive retinopathy according to Keith and Wagener's classification shows that 61.4% of cases were stage III.

Conclusion: Heart disease and kidney diseases are recurrent cardiovascular comorbidities in malignant arterial hypertension that is complicated by exudative haemorrhagic retinopathy, without any association with a specific comorbidity.

Keywords: Eye Injuries; Malignant Hypertension; Donka Hospital

Introduction

High blood pressure (hypertension) is a major public health problem because of its frequency and complications, the malignant form although rare with the advent of antihypertensive drugs can have multiple consequences [1]. Conventionally, malignant

hypertension combines severe hypertension (according to definitions $>180/120$ mmHg) and severe hypertensive retinopathy (stage III and IV of the Keith and Wegener classification) [2-4]. It is a therapeutic emergency because of the progressive risk towards hypertensive encephalopathy, progressive renal failure

or heart failure [5], as well as vascular failure of the fundus and accompanying visual disturbances [1].

In chronic dialysis patients in the Nephrology Department of the IBN-Rochd-Casablanca University Hospital, hypertensive retinopathy was present in 23.07% of cases [6].

In the Nephrology Department of the CHU point G, malignant hypertension represented 8.2% of admissions, including papillary edema at the back of the eye found in 26.4% of cases [7].

In Guinea, stage III retinopathy was present in 66.12% of patients with malignant hypertension at Donka National Hospital [8].

Given the multiplicity of comorbidities of malignant hypertension, its frequent association with eye lesions, we initiated this study with the objective of describing the different ophthalmological lesions encountered in patients with malignant arterial hypertension associated with cardiovascular comorbidity.

Patients and Methods

The Centre d'Application du Diplôme d'Etudes Spécialisées en Ophtalmologie (CADES/O) located within the Donka National Hospital provided the framework for this study. Created in 2011 with the vocation to know: care, training and scientific research.

We carried out a transversal, descriptive study lasting 06 months from 09 November 2020 to 08 May 2021.

In this study, we have all hypertensive patients with blood pressure figures greater than 180 mmHg/120 mmHg, who presented on the FO examination with stage III or IV hypertensive retinopathy according to the Keith and Wagener classification who agreed to participate in the study.

Patients who had malignant hypertension but did not receive ophthalmological examination were not included.

Patients who presented with malignant hypertension in the cardiology and nephrology departments were automatically referred to CADESSO for a complete ophthalmological examination. For each patient we proceeded as follows: The first step of the ophthalmological consultation was to measure visual

acuity with optotypes (Snellen scales). The ocular examination is performed with the biomicroscope, looking for abnormalities of the anterior segment, then taking the intraocular pressure with the Goldmann flattening tonometer. Finally, after axial m dilatation, we performed the examination of the fundus either by the ophthalmoscope or by the Volk lens in order to visualize the posterior segment (fundus).

Our analysis focused on socio-demographic characteristics (age in completed year, sex, occupational category, education, marital status and residence), cardiovascular risk factors: advanced age (>60 years), smoking, chronic alcoholism, diabetes, obesity (BMI ≥ 30). Cardiovascular comorbidities: Heart disease (grouped heart conditions in relation to hypertension, with evidence from ultrasound and ECG), Kidney disease (preferably CKD), Diabetes confirmed by glycated hemoglobin or ongoing treatment, stroke (confirmed by brain scan). Ocular symptoms: FO eye lesions (Hemorrhages, Exudates, Cottony Nodules, Papillary Edema). Type of retinopathy according to Keith and Wegener's cation.

Our data were analyzed by the statistical software package of social science version 22. All the analysis was performed at 5% bilateral alpha risk, we performed the descriptive statistic (mean, standard deviation, proportion), then the exact Pearson or Fisher chi-two tests followed by the univariate logistic regression, moreover we could not perform the multivariate regression because of our relatively small sample size.

Before each examination, we interviewed each patient confidentially, while explaining the collection procedures in order to obtain his free and informed consent, the collection sheet used did not take into account the identity of the patient.

Results

From 09 November 2020 to 08 May 2021, 2728 patients were admitted to CADESSO, among whom, 279 were hypertensive or 10.23% including 46 cases of malignant hypertension or a frequency of 16.49%. Our scope analysis of 44 patients and 2 were excluded (Figure 1).

The sociodemographic description of the patients studied shows that the average age of the patients was 44 ± 13.6 years, with men the most numerous (59.1%). Housewives and shopkeepers

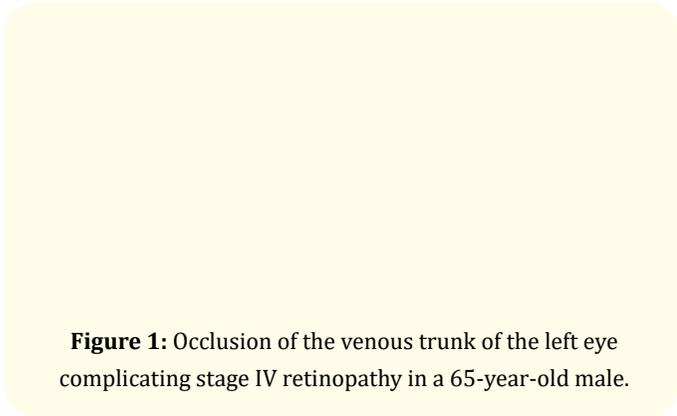


Figure 1: Occlusion of the venous trunk of the left eye complicating stage IV retinopathy in a 65-year-old male.

were the most concerned with proportions of 27.3% and 22.7% respectively. Our study population consisted of 59.1% of those who were not in school, followed by those with primary education (22.7% (Table 1).

Socio-demographic characteristics	Staff (N = 44)	Percentages
Average age ± Standard deviation	44,00 ± 13,611	
Sex		
Male	26	59,1
Female	18	40,9
Professional category		
Official	6	13,6
Housewife	12	27,3
Merchant	10	22,7
Farmer	1	2,3
Student/student	1	2,3
Manual workers and other occupations	13	29,6
No profession	1	2,3
Educational attainment		
Out of school	26	59,1
Primary	10	22,7
Secondary	5	11,4
Upper	3	6,8
Marital status		
Bachelor	8	18,2
Married	35	79,5
Divorced	1	2,3
Residence		

Conakry	26	59,1
Lower Guinea	10	22,7
Middle Guinea	4	9,1
Upper Guinea	1	2,3
Forest Guinea	3	6,8

Table 1: Distribution by sociodemographic characteristics of the 44 patients studied at CADES/O of the Donka National Hospital (2021).

Cardiovascularly, 34.1% of patients were of advanced age and 22.7% were smokers. Among cardiovascular comorbidities, heart disease, renal pathologies and diabetes were the most found, respectively 70.5%, 65.9% and 18.2% (Table 2).

Cardiovascular risk factors and comorbidities	Staff (N = 44)	Percentages
Cardiovascular risk factors		
Advanced age	15	34,1%
Tobacco	10	22,7%
Alcohol	6	13,6%
Diabetes	8	18,2%
Obesity	8	18,2%
Comorbidities		
Heart	31	70,5%
Kidney disease (CKD*)	29	65,9%
Diabetes	8	18,2%
STROKE**	1	2,3%

Table 2: Frequency of risk factors and cardiovascular comorbidities in 44 patients with malignant hypertension at CADES/O of Donka National Hospital (2021).

*Renal failure

**Stroke.

Clinically, ocular symptoms were dominated by visual blur and decreased visual acuity were 84.1% and 56.8%, respectively. Fundus examination, retinal hemorrhage, exudates and cottony nodules were the most identified lesions at 79.5%, 65.9% and 47.7% respectively. Hypertensive retinopathy was the most common at 61.1%. Keith and Waner’s classification shows that 61.4% of patients were stage III (Table 3).

Eye damage	Staff (N = 44)	Percentages
Symptoms		
Visual blur	37	84,1%
BAV*	25	56,8%
Phosphene	1	2,3%
FO eye damage		
Bleeding	35	79,5%
Exudates	29	65,9%
Cottony nodules	21	47,7%
Papillary oedema	17	38,6%
Stage of retinopathy**		
Stade III	27	61,4
Stade IV	17	38,6

Table 3: Description of ocular involvement in 44 patients with malignant hypertension at CADES/O of Donka National Hospital (2021)

*Decreased visual acuity.

** Keith and Wagener classification.

Logistic regression of comorbidities (diabetes, CKD and heart disease) shows no significant association between comorbidity and fundus-specific eye injury in patients with malignant hypertension with p-values less than 0.05 (Table 4, Table 5 and Table 6).

Diabetes	Odds-ratio	95% confidence interval for odds-ratio	p-value
Exudates			
Yes	0,833	[0,170-4,088]	0,822
Not	Reference		
Cottony nodule			
Yes	1,118	[0,241-5,175]	0,887
Not	Reference		
Bleeding			
Yes	2,000	[0,213-18,745]	0,544
Not	Reference		
Papillary oedema			
Yes	0,943	[0,194-4,580]	0,942
Not	Reference		

Table 4: Logistic regression of diabetes with eye lesions during malignant arterial hypertension at CADES/O of Donka National Hospital (2021).

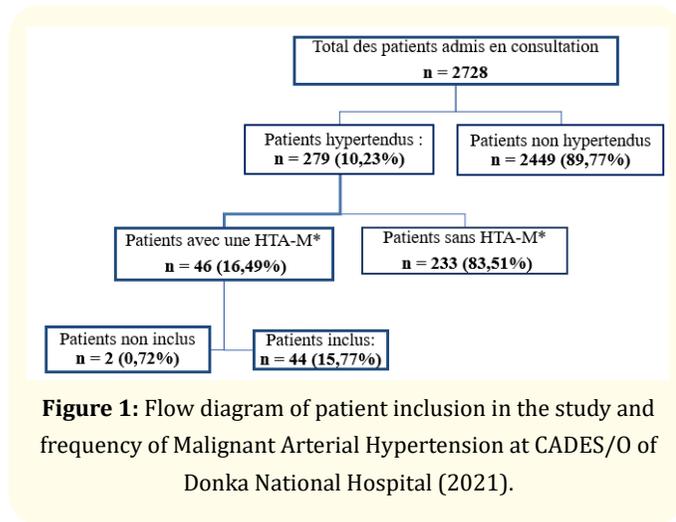
Chronic renal failure	Odds-ratio	95% confidence interval for odds-ratio	p-value
Exudates			
Yes	0,595	[0,151-2,338]	0,457
Not	Reference		
Cottony nodule			
Yes	0,471	[0,132-1,676]	0,245
Not	Reference		
Bleeding			
Yes	0,484	[0,087-2,685]	0,406
Not	Reference		
Papillary oedema			
Yes	0,917	[0,256-3,286]	0,894
Not	Reference		

Table 5: Logistic regression of chronic renal failure with retinal lesions during malignant arterial hypertension at CADES/O of Donka National Hospital (2021).

Heart	Odds-ratio	95% confidence interval for odds-ratio	p-value
Exudates			
Yes	1,313	[0,341-5,050]	0,692
Not	Reference		
Cottony nodule			
Yes	1,094	[0,299-4,006]	0,892
Not	Reference		
Bleeding			
Yes	1,250	[0,261-5,996]	0,780
Not	Reference		
Papillary oedema			
Yes	0,642	[0,172-2,391]	0,509
Not	Reference		

Table 6: Logistic regression of heart disease during malignant hypertension at CADES/O of Donka National Hospital (2021).

Iconography



Discussion

In patients with hypertension associated with cardiovascular comorbidity, it is important to consider all possible manifestations of hypertension that could contribute to both eye damage and visual decline in later life. We conducted a descriptive study in patients with malignant hypertension associated with cardiovascular comorbidity with the aim of identifying eye damage.

The low sample size is justified firstly by the fact that the Donka National Hospital is under construction at the time of this study but also by the Covid-19 pandemic considerably reducing the attendance of hospital structures in general.

Despite these difficulties, we have still achieved some results.

In this series, malignant hypertension accounted for 16.49% of hypertension cases admitted to the service. The study by Sylla, *et al.* [8], shows that the frequency of malignant hypertension was 12.35% among 502 hypertensive patients recruited at Donka National Hospital in 2019. Multidisciplinary collaboration in hospitals has made it possible to refer patients to the nephrology and hemodialysis department for better care.

On the sociodemographic level, of the patients were elderly adults, our average age is higher than that reported by Yattara, *et al.* [7] in the Nephrology Department of the CHU point G, 37 years, on the other hand relatively close to that reported in Côte d’Ivoire, whose average age was 41.10 ± 14.86 years [10].

The population studied was mainly made up of men, this observation has been reported several times in the literature, particularly in Mali (72% male, sex ratio equal to 2.5) [7], Côte d’Ivoire (sex ratio of 1.54) [10] and China (79% male) [11].

Patients who had never been to school were the most represented, this observation is the same for Sylla, *et al.* [8] who reported that according to the level of education that patients who had never been to school were the most affected (35.48%).

On the cardiovascular level, apart from hypertension, the risk factors were not modifiable (advanced age, 34.1%) and smoking (22.7%) were the most frequent. In China 2020, history of hypertension (62%), smoking (46%) and a history of diabetes (23%) [11].

In Mali, modifiable cardiovascular risk factors were dominated by smoking (27.4%), dyslipidemia (22%), obesity (9.8%), diabetes (8.8%) and alcoholism (5.2%) [7]. In Côte d’Ivoire, cardiovascular risk factors were hypertension (79.20%), alcohol (32.10%), tobacco (19.60%) [10].

Among cardiovascular comorbidities, heart disease, renal pathologies and diabetes. In the study by Aka, *et al.* [10] reported that chronic kidney disease (15.30%) and diabetes (11.30%). This is why the treatment of malignant hypertension and its ophthalmic sequelae is generally focused on the management of systemic disease [1].

Ocular involvement resulted clinically in visual blurring and decreased visual acuity. In the series of Ngongang Ouankou, *et al.* [12] in a country in sub-Saharan Africa found that eye symptoms were dominated by phosphenes (20.3%) and blurred vision (20.3%).

On examination of the fundus, retinal hemorrhage, exudates were the most identified lesions. Ocular involvement is characterized by the presence of dry exudates, cottony nodules or hemorrhages at the fundus, were the lesions observed in the study by Kuntz, *et al.* [13] in 2018. On the other hand, in patients with malignant hypertension at the CHU point G, papillary edema at the fundus (26.4%) was the most observed eye lesion. These phenomena are due to the exceeding of the local system of self-regulation of pressure in case of severe hypertension, changes in

the fundus type hypertensive retinopathy result from a failure of self-regulation, supply to the autonomic nerve and blood-retinal barrier systems [1,14].

Hypertensive retinopathy (61.1%) was the most recurrent generally at stage III (61.4%) according to Keith and Wagener's classification, however in the study by Ngongang Ouankou., *et al.* [12] stage III accounted for only 4%, Sylla., *et al.* [8] reported that Stage III fundus accounted for 66.12% of cases. The fact that most patients were not at the stage of malignant hypertension with the presence of vascular failure such as stage III retinopathy would justify these results.

Univariate analysis of comorbidities (diabetes, CKD and heart disease) shows no lesional specificity on fundus examination in patients with malignant hypertension. Although we did not find evidence of a possible association of specific lesions by comorbidities in the literature, but we remain convinced that a study with a very large sample would show a difference.

Conclusion

This series has shown that hypertensive retinopathy due to malignant hypertension is a common condition in daily practice at CADES. Patients with malignant hypertension were adults in their forties of male predominance generally uneducated. Older age and smoking were the most recurrent cardiovascular risk factors with which heart disease and kidney disease were frequently associated. Visual blurred and decreased visual acuity were the common eye symptoms whose fundus largely showed retinal hemorrhage and exudates. Hypertensive retinopathy was the most common and in more than half of cases stage III. Alesional specificity on fundus examination in patients with malignant arterial hypertension has not been observed.

Resume

Introduction: The objective of this study was to describe the different ophthalmological lesions encountered in patients with malignant hypertension associated with cardiovascular comorbidity.

Patients and Methods: We included in our study all hypertensive patients with blood pressure figures greater than 180 mmHg/120 mmHg, who presented on examination with stage III or IV

hypertensive retinopathy according to the Keith and Wagener classification. For each patient we measured visual acuity with optotypes, eye examination with the biomicroscope, then visualize with the volk lens the posterior segment (fundus 'eye). We performed the descriptive statistic followed by exact chi-square or Fisher tests followed by logistic regression.

Result: Out of 279 hypertensive patients received, we recorded a frequency of 16.49% of malignant arterial hypertension. Patients had an average age of 44 ± 13.6 years, men were the most numerous (59.1%) and 59.1% out-of-school. Heart disease (70.5%) and renal pathologies (65.9%) were most associated with malignant hypertension. Clinically, ocular symptoms were dominated by visual blur and decreased visual acuity were 84.1% and 56.8%, respectively. Retinal hemorrhage and exudates were 79.5% and 65.9%, respectively. Hypertensive retinopathy according to the Keith and Wagener classification shows that 61.4% cases were in stage III.

Conclusion: Heart disease and renal pathologies are recurrent cardiovascular comorbidities in malignant arterial hypertension that is complicated by exudative hemorrhagic retinopathy, without any association with a specific comorbidity.

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