

Pulsed Pressure Study among Hypertensive Patients in a Cardiology Department, Bamako (Mali)

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Abstract

Objectives

To determine the prevalence of abnormal PP and to explore with it associated factors, especially through comparing 3 groups of hypertensive outpatients: untreated, previously treated and currently being treated

Methodology

The cross sectional study was performed from August 25 to December 25 2011 in the Department of Cardiology of the Mother-Child Hospital “Le Luxembourg “ on hypertensive outpatients at least 18 years old, regardless of gender. Patients were divided into 3 groups: newly diagnosed (Gr1), previous antihypertensive treatment (Gr 2) and current antihypertensive treatment (Gr 3). Data were analysed using SPSS v. 12.

Results

The prevalence of abnormal PP was 51.4% (70.6, 52.8 and 49.2% resp. for Gr 1, Gr 2 and Gr 3 with a non-significant p. Diabetes, body mass index, smoking and admission type showed a significant difference. High level of uric acid, serum creatinine and cholesterol showed no statistically significant difference between the 3 groups. Most of the patients were treated with mono-or dual therapy with a significant difference resp. 13.4% and 11 6%.

Conclusion

This study estimated the prevalence of abnormal pulsed pressure, without being able to establish significant differences in PP depending on the level of treatment. The effect of treatment over the time should be the subject of another study.

Keywords: High blood pressure; Pulsed pressure; Adult outpatient; Bamako

Introduction

Pulsed pressure (PP) is recognized as an independent cardiovascular risk factor [1-5]. The PP seems to differ according to race and sex (higher in the black subject and man) [6] and subject to the effect of antihypertensive treatment [7, 8].

Different values are retained to consider PP as abnormal, 60 [9], 63 [10] or 65 mmHg [7, 11]

PP has been little evaluated in our daily practice, even simple to collect. In sub-Saharan Africa data on PP are rare [9].

To overcome this lack of data, we conducted this study, which aims to determine the prevalence of abnormal PP and to study factors associated with pulsed pressure, through comparing 3 groups of hypertensive patients: untreated, irregularly treated and regularly treated.

Methodology

This cross-sectional study was carried out from August 25 to December 25 in 2011 in the department of Cardiology of the University Hospital "Mère-Enfant Le Luxembourg". Involved were patients aged 18 years and more, hypertensive patients, seen as outpatient and willing to participate in the study.

PP was obtained on both arms as mean of two values (begin and end of visit). The highest value was chosen for the study. All patients were seen at least twice, allowing the retrieval of the results of additional requested labour tests and for high blood pressure confirmation for some of these patients.

PP value above 65 mmHg was considered as abnormal [11, 12].

We divided our patients into 3 groups:

- Group 1 (Gr1): newly screened patients
- Group 2: (Gr2): prior antihypertensive treatment (patient irregularly treated or who stop treatment)
- Group 3: (Gr3): patient under antihypertensive treatment

Since drug therapy has an effect on pulse pressure, we postulated that it would be the highest in Group 1, followed by Group 2 and Group 3.

The data were collected under MS Access, processed by MS Excel and analysed with SPSS v 12.

Results

The study covered 276 patients with an average age of 53.05 years [22-88], female sex representing 70.7% of the sample.

Most patients resided in Bamako and suburbs (85.5%). The most common occupations were housewives and government employees with 45.7% and 27.5%, respectively.

Patients in Group 3 accounted for 67.8%, Group 2 patients 26.1% and Group 1 patients 6.2%.

The prevalence of abnormal PP (> 65 mmHg) was 51.4% (70.6, 52.8 and 49.2%, respectively, for groups 1, 2 and 3 with $p=0,232$ (Table I).

Mean PP in mmHg was 69.56, 67.78 and 65.17 respectively for groups 1, 2 and 3.

Among other cardiovascular risk factors, diabetes, body mass index, smoking and mode of admission had a significant difference (Table I).

Table I: Sample characteristics of the 3 patients groups

Variables		Groups N (%)			Total	p
		1	2	3		
Age groups (years)	< 30	0 (0,0)	8 (2,9)	2 (0,7)	10 (3,6)	< 0,0001
	30-44	0 (0,0)	22 (8,0)	43 (15,6)	65 (23,6)	
	45-59	8 (2,9)	22 (8,0)	80 (29,0)	110 (39,9)	
	>= 60	9 (3,3)	20 (7,2)	62 (22,5)	91 (33,0)	
PP	< 65	5 (1,8)	34 (12,3)	95 (34,4)	134 (48,6)	0,232
	> 65	12 (4,3)	38 (13,8)	92 (33,3)	142 (51,4)	
Body mass index	Underweight	4 (1,4)	4 (1,4)	3 (1,1)	11 (4,0)	0,001
	Normal	3 (1,1)	14 (5,1)	49 (17,8)	66 (23,9)	
	Overweight	3 (1,1)	29 (10,5)	59 (21,4)	91 (33,0)	
	Obesity	7 (2,5)	25 (9,1)	76 (27,5)	108 (39,1)	
Tobacco smoking	No	13 (4,7)	68 (24,6)	173 (62,7)	254 (92,0)	0,044
	Yes	4 (1,4)	4 (1,4)	14 (5,1)	22 (8,0)	
Diabetes	No	17 (100)	67 (93,1)	153 (81,8)	237 (85,9)	0,015
	Yes	0 (0)	5 (6,9)	34 (18,2)	39 (14,1)	
Admission Mode	No Symptom	0 (0)	1 (0,4)	44 (15,9)	45 (16,3)	<0,0001
	Referred	1 (0,4)	13 (4,7)	22 (8,0)	36 (13,0)	
	Symptomatic	16 (5,8)	58 (21,0)	121 (43,8)	195 (70,7)	

Abnormal PP was 40.5% for patients <60 years and 73.6% for those > 60 years with a significant $p < 0.0001$ (Table II).

Table II: PP related to patients age

PP Value (mmHg)	Age groups (years) N(%)		Total	p
	< 60	> 60		
< 65	110 (39,9)	24 (8,7)	134 (48,6)	< 0,0001
> 65	75 (27,2)	67 (24,3)	142 (51,4)	
Total	185 (67,0)	91 (33,0)	276 (100)	

The difference becomes not significant if age with groups were considered (Table III).

Table III: PP distribution related to age and patients groups N (%)

Patients groups	< 60 ans		> 60 ans	
	< 65 mmHg	> 65 mmHg	< 65 mmHg	> 65 mmHg
1	4 (2,2)	4 (2,2)	1 (1,1)	8 (3,8)
2	31 (16,8)	21 (11,4)	3 (3,3)	17 (18,7)
3	75 (40,5)	50 (27,0)	20 (22,0)	42 (46,2)

Biological abnormalities (hyperuricemia, hypercreatininaemia and hypercholesterolemia) did not find any statistically significant difference between the 3 groups.

Of the complementary examinations performed, only the decrease in the ejection fraction showed a statistically significant difference. Left ventricular hypertrophy, left atrial dilatation did not show significant difference between the 3 groups.

The vast majority of patients were treated with mono- or bitherapy with a significant difference (Table IV). Drug prescriptions were dominated by the calcium channel blocker (13.4%) for monotherapy and Angiotensin Converting Enzyme Inhibitor-diuretic bitherapy (11.6%).

Table IV: Treatment by patient groups

Treatment mode	Patients groups N (%)			Total	p
	1	2	3		
None	17 (6,2)	0 (0,0)	0 (0,0)	17 (6,2)	< 0,0001
Untreated HTN	0 (0,0)	72 (26,1)	0 (0,0)	72 (26,1)	
Monotherapy	0 (0,0)	0 (0,0)	87 (31,5)	87 (31,5)	
Bitherapy	0 (0,0)	0 (0,0)	67 (24,3)	67 (24,3)	
Tritherapy	0 (0,0)	0 (0,0)	27 (9,8)	27 (9,8)	
Quadritherapy	0 (0,0)	0 (0,0)	6 (2,2)	6 (2,2)	

Discussion

Our starting hypothesis was that PP is higher depending on the degree of treatment of the patient (the highest when there is no treatment and the lowest for patients on treatment).

The prevalence of abnormal PP in our sample was 51.4% for the threshold of 65 mmHg, or even 64.5% when we consider 60 mmHg, prevalence higher than that of Konin [8] which had 60% but Taking a threshold of 60 mmHg as the normality limit. In neighbour countries and in the literature in general we have not found studies on the prevalence of pulsed pressure.

Our sample is relatively young with mostly women compared to other studies [5, 9], highlighting, on the one hand, difficulties to health access for the very old and on the other hand the fact that women consult more early only men.

Although not statistically significant, mean PP and the prevalence of abnormal PP are higher in the group of new hypertensive patients (Group 1) than in the other 2 groups more or less medically treated.

Considering only the age criterion, we have a higher prevalence of abnormal pulsed pressure for patients over 60 years of age with $p < 0.0001$, which is consistent with literature data, PP growing with age [11] and especially after 55 years [1].

On the other hand, combining age criterion and the 3 groups, the value of p is no longer significant as indicated in Table VI. Possible explanation could be the relatively young age of our patients with an average of 53 years.

The association of PP with different risk factors was found for diabetes, smoking and body mass index. Also, the pattern of consultation for symptoms was more common in newly diagnosed hypertensive patients (group 1), while the other 2 groups were more likely to be routinely monitored (group 3) or referred (group 2) (Table I). The explanations could be the fact for the patients of groups 2 and 3 to have already had information on the respect of the appointments fixed by physicians.

Unlike other studies, we did not find any significant difference in labour tests, in particular hyperuricemia and hypercholesterolemia between the 3 groups. One explanation could be found in the relatively young age of patients, who would not have had time to develop complications. This also applies to left ventricular hypertrophy and echocardiographic changes, all reflecting the duration and severity of hypertension.

There was a significant difference between the 3 groups regarding prescriptions as shown in Table IV. Newly diagnosed patients had no treatment, treatment was not known for Group 2 patients, and only Group 3 patients shared antihypertensive drugs.

Conclusion

Abnormal PP is very common in hypertensive patients with no significant difference depending on whether the patient is untreated, previously treated or currently under treatment.

PP remains not often used in the assessment of the cardiovascular risk of our patients. Because of its predictive value it should be considered because it is simple to be calculated and should be an indicator in the follow-up of antihypertensive treatment.

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